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The High-Employment Budget: New Estimates, 1955-80

CONTENTS

A summary measure of the impact of a Federal fiscal program on aggregate demand is a useful tool for economic analysis. It has long been recognized that actual budget surpluses or deficits are deficient for this purpose. A major source of the deficiency is that changes in actual surpluses or deficits reflect changes in receipts or expenditures that are automatic responses to fluctuations in economic activity, that is, they reflect changes that are not due to discretionary fiscal policy, such as new legislation. The high-employment budget provides a better tool because it removes these changes by measuring receipts and expenditures as they would be at high lempoyment.

The concept of the high-employment budget originated in 1947 in a policy statement by the Committee for Economic Development.[1] It was used in the *Economic Report of the President* for the first time in 1962, and since then it has been prominent in discussions of fiscal policy.

1. *Taxes and the Budget: A Program for Prosperity in a Free Economy* (New York: Committee for Economic Development, 1947). For a discussion of the history of the high-employment budget or, as it was once called, the full employment budget, see Herbert Stein, *The Fiscal Revolution in America* (Chicago: University of Chicago Press, 1969), especially chapter 9.

In the past, the Council of Economic Advisers (CEA) provided the official estimates of the high-employment budget. This article presents a new set of estimates, for the period from 1955 through the second quarter of 1980, prepared jointly by the Bureau of Economic Analysis, the CEA, the Federal Reserve Board, the Office of Management and Budget, and the Treasury Department. With the publication of the new estimates, BEA assumes responsibility for the maintenance and improvement of current and historical high-employment budget estimates. Current quarterly estimates will be published in the SURVEY OF CURRENT BUSINESS. The CEA will retain responsibility for projections of the high-employment budget, and for all estimates of potential, i.e., high-employment GNP and high-employment labor force, which are used in estimating the high-employment budget.

The relation between the actual and high-employment surplus or deficit can be explained by reference to chart 2.[2] In the chart, the vertical axis measures the budget surplus or deficit and the horizontal axis measures the ratio of GNP to high-employment GNP. For

the fiscal program of year 1, the relation between GNP and the surplus or deficit is depicted by the line labeled "year 1." The positive slope of the line reflects the changes in receipts and expenditures that are mainly automatic responses to fluctuations in economic activity. For example, unemployment benefits vary inversely with economic activity and income tax receipts vary directly. For year 1, GNP as a percentage of high-employment GNP is represented by the point "year 1" on the horizontal axis, and the actual deficit is equal to "actual, year 1" on the vertical axis. The high-employment surplus is equal to "high-employment, year 1" on the same axis, corresponding to the high-employment point on the horizontal axis.

For the year 2 fiscal program, the relation between GNP and the surplus or deficit is depicted by the line labeled "year 2." The downward shift in the line indicates a more expansionary fiscal program—expenditures have been increased or tax rates reduced. The expansionary change is reflected in a fall in the high-employment surplus from year 1 to year 2 on the vertical axis. Suppose that the change in the fiscal program together with other factors—for example, a monetary policy that stimulates final demand—cause GNP to increase as a percentage of high-employment GNP

to "year 2" on the horizontal axis. Under these conditions, there is an actual surplus in year 2, compared with an actual deficit in year 1. The high-employment budget shows—correctly—an expansionary policy move; the actual budget does not. The contrast is due to the fact that the high-employment budget reflects only the shift from the year 1 line to the year 2 line; the actual budget reflects both the shift from the year 1 line to the year 2 line and movement along the year 2 line.

This chart also can be used to explain the estimating work that underlies the high-employment budget. This budget can be viewed as the intersection of fiscal program lines and the high-employment GNP line, both of which must be estimated. This article describes in detail the way BEA estimates the fiscal program lines; the way high-employment GNP is estimated by the CEA is described more briefly.

The practical importance of distinguishing between the actual and the high-employment surplus or deficit can be illustrated by developments in 1973–74. From the fourth quarter of 1973 to the fourth quarter of 1974, the actual deficit increased from $5.3 billion (annual rate) to $21.7 billion, and as a percentage of GNP, changed from −0.4 to −1.5 (chart 3).[3] In contrast, the high-employment budget moved from a deficit of $5.9 billion to a surplus of $8.3 billion, and as a percentage of potential GNP, moved from −0.4 to 0.5. The contrasting changes indicate that the increase in the actual deficit was not due to discretionary fiscal policy, but instead was due to automatic responses—to a drop in tax receipts and an increase in transfer payments accompanying the onset of the 1974–75 recession.

This discussion of developments in 1973–74 is representative of one of the ways in which the high-employment budget has been used in economic analysis. It has also been used in econometric studies where the impact of

2. For similar diagrams, see the *Economic Report of The President* (Washington, D.C.: U.S. Government Printing Office, January 1962), p. 79; and Joseph A. Pechman, *Federal Tax Policy*, 3d ed. (Washington, D.C.: The Brookings Institution, 1977), p. 14.

CHART 2

Relation Between Actual and High-Employment Surplus or Deficit
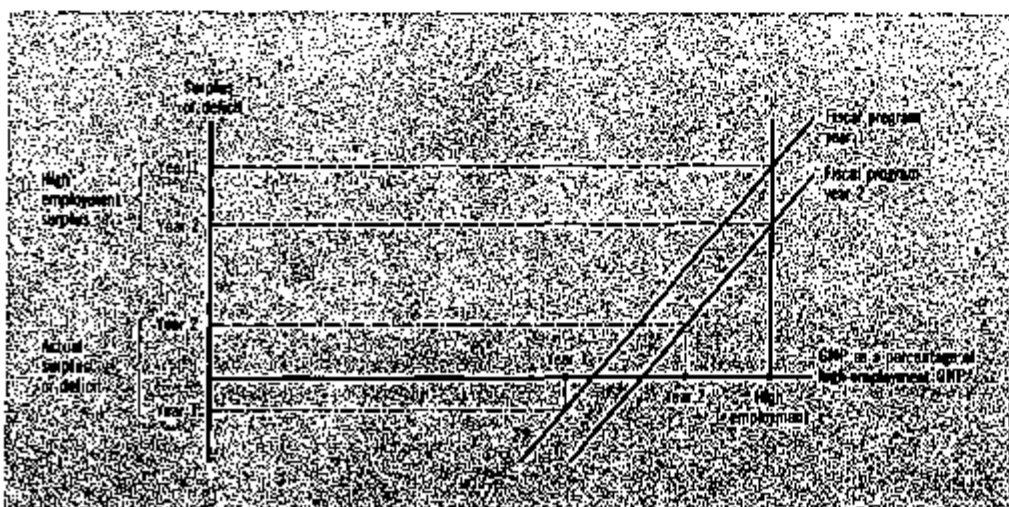
3. These estimates, like all estimates of receipts, expenditures, and surplus or deficit in this article, are based on the Federal Government sector of the national income and product accounts. For the relation between these estimates and the unified budget, see "Federal Fiscal Programs" in the February 1980 SURVEY OF CURRENT BUSINESS.

CHART 3

Actual and High-Employment Surplus or Deficit

Percent
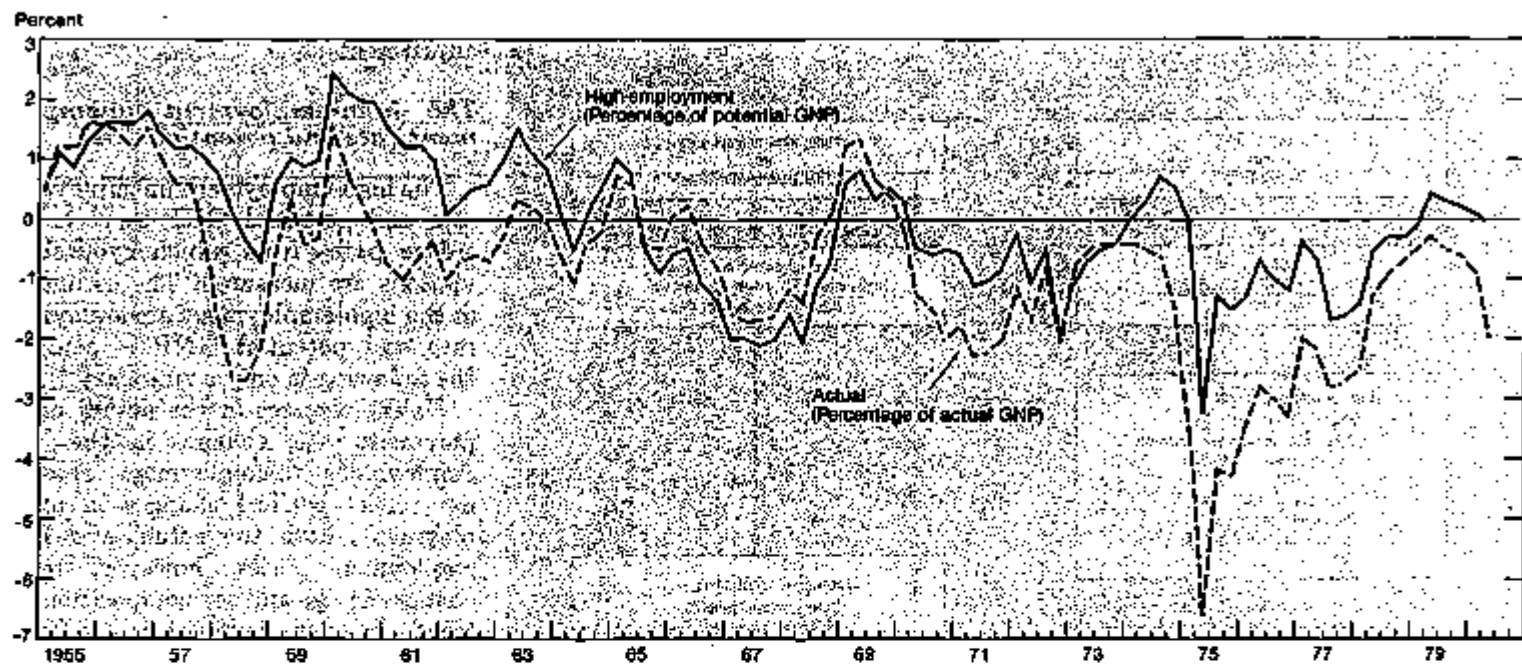
U.S. Department of Commerce, Bureau of Economic Analysis

fiscal programs is a variable along with others, such as measures of the impact of monetary policies, used to explain economic activity.[4] Other uses of the high-employment budget have been in setting rules of thumb for budgetary policy. For example, the *Economic Report of The President* for 1973 stated, in referring to the budget, that "constancy of the balance at full employment is the best single guide to budget policy that neither pushes the economy above its desired growth rate nor holds the economy below it." [5]

The next section summarizes the procedures used to estimate the high-employment budget. It highlights two important innovations: the use of a "gross-up method" of estimating high-

4. See, for example, Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Action: A Test of Their Relative Importance in Economic Stabilization," Federal Reserve Bank of St. Louis, *Monthly Review* (November 1968), pp. 11-24, and Edward M. Gramlich, "The Usefulness of Monetary and Fiscal Policy as Discretionary Stabilization Tools," *Journal of Money, Credit, and Banking* (May 1971), pp. 506-32.

5. *Economic Report of the President* (January 1973), p. 74. See also a report to the Organization for Economic Cooperation and Development, by Paul McCracken et al., *Toward Full Employment and Price Stability* (Paris: Organization for Economic Cooperation and Development, 1977), especially pp. 225-28, and Committee for Economic Development, *Taxes and the Budget: A Program for Prosperity in a Free Economy* (New York: Committee for Economic Development, 1947).

employment income shares and receipts, and estimation of high-employment levels for expenditure categories in addition to unemployment benefits. It also discusses limitations of the high-employment budget—most importantly, its inability to deal adequately with inflation in measuring receipts and expenditures. Thereafter, the new estimates of the high-employment budget for 1955-80 are presented. The final section describes in detail the methodologies and results for individual components.

Overview of the Methodology

This section summarizes the steps in constructing the new estimates of the high-employment budget. The flow diagram in chart 4 sets out these steps. The first steps—shown on the left and right sides, respectively, of the flow diagram—are the estimation of a GNP gap, based on potential and actual GNP, and of an unemployment rate gap, based on high-employment and actual unemployment rates. The GNP gap reflects deviations from the smooth growth path of potential GNP and serves as the cyclical variable in the estimation of high-employment income

shares and receipts. The unemployment rate gap reflects deviations from the unemployment rate associated with potential GNP and serves as the cyclical variable in the estimation of high-employment expenditures.

The GNP gap (current and lagged) is the principal variable used to estimate gross-ups, i.e., differences between estimated high-employment and estimated actual levels, for wages and salaries and for the other income shares. The income shares gross-ups, in turn, are used together with tax elasticities to estimate receipts gross-ups, i.e., differences between estimated high-employment and estimated actual levels of tax receipts. Receipts gross-ups are positive when potential GNP is above actual GNP. Receipts gross-ups are added to actual tax receipts to arrive at high-employment receipts.
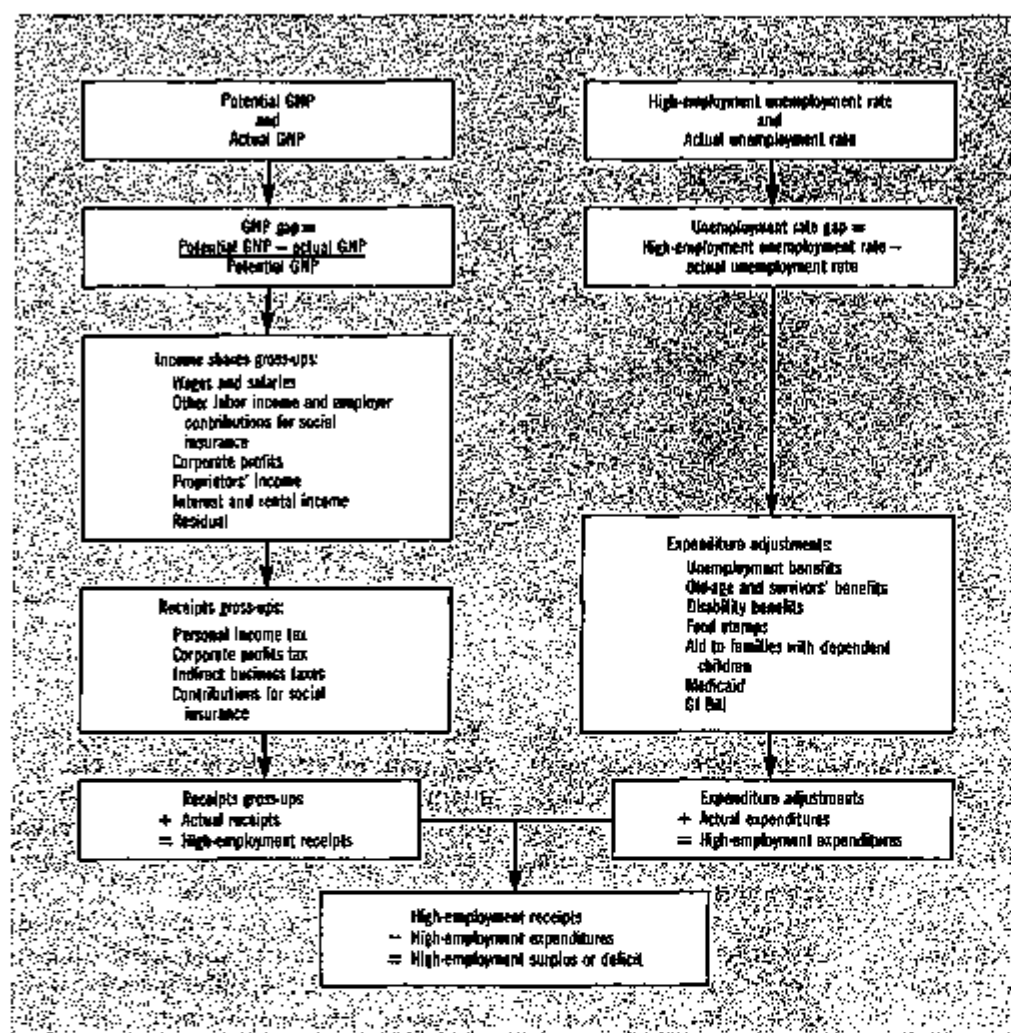
The unemployment rate gap (current and lagged) is the principal input in the estimation of expenditure adjustments, i.e., differences between estimated high-employment and estimated actual expenditures for seven cyclically sensitive expenditure categories. Expenditure adjustments are negative when the actual unemployment rate is above the high-employment unemployment rate be-

CHART 4

Steps in Estimating the High-Employment Budget

U.S. Department of Commerce, Bureau of Economic Analysis.

estimate the high-employment unemployment rate and potential GNP, the income shares gross-ups, the receipts gross-ups, and the expenditure adjustments.

The high-employment unemployment rate and potential GNP

The high-employment unemployment rate and potential GNP serve as reference paths from which cyclical deviations are measured. The estimation of the high-employment unemployment rate and potential GNP is complex; the following is only a summary.[8]

Unlike changes in the actual unemployment rate, changes in the high-employment unemployment rate do not reflect cyclical changes in unemployment; both the actual and high-employment rates, however, reflect changes in age and sex composition and trends in unemployment rate differentials among groups. Because unemployment rates vary greatly by age and slightly by sex, the overall unemployment rate will change when the age-sex composition of unemployment changes even if the rate for each individual age-sex group stays the same. However, the rates for the various groups have not remained the same. Since the mid-1950's, the combined effects of an increase in the proportion of young persons in the labor force and an increase in their unemployment rate relative to the overall rate have been to raise the high-employment unemployment rate from 4 percent in 1955, the year assumed to represent high-employment, to 5.1 percent in 1979. The high-employment and actual unemployment rates, and the gap between them, are shown in table 1.

Potential real GNP, i.e., potential GNP in 1972 dollars, is an estimate of output the economy could produce at the high-employment unemployment rate with existing working-age popula-

cause increasing unemployment causes cyclically sensitive expenditures to increase. The expenditure adjustments are added to actual expenditures to arrive at high-employment expenditures.

This method of constructing the high-employment budget resembles earlier methods, but there are two important innovations. One is the gross-up method of estimating high-employment income shares and receipts. The gross-up method consists of obtaining differences between estimated high-employment and estimated actual income shares or receipts and adding these differences to actual levels to obtain high-employment levels.[6] Earlier methods estimated high-employment levels directly and did not ensure, as the gross-up method does,

that actual and high-employment receipts are equal when the economy is at potential GNP. The second innovation consists of estimating high-employment levels for six cyclically sensitive expenditure categories in addition to unemployment benefits, the only program for which earlier methods estimated high-employment expenditures.[7] The additional categories are old-age and survivors benefits, disability benefits, food stamps, aid to families with dependent children, medicaid, and veterans education benefits (GI bill).

The remainder of this section summarizes, in turn, the methods used to

6. A discussion of the gross-up method (although the term "gross-up" is not used) appears in Michael E. Levy, *Fiscal Policy Cycles and Growth* (New York: The Conference Board, 1963), pp. 83-84, 103-4.

7. The first study of the cyclical sensitivity of expenditures other than unemployment benefits was by Nancy H. Teeters, "Built-in Flexibility of Federal Expenditures," *Brookings Papers on Economic Activity*, no. 3 (1971), pp. 615-58. The estimates presented in this article rely on a recent study by Darwin G. Johnson, "Sensitivity of Federal Expenditures to Unemployment," Office of Management and Budget technical staff paper (April 1980). Johnson examined the cyclical sensitivity of Federal expenditures other than the ones covered in the new estimates, and found them to be relatively invariant to the business cycle.

8. A detailed description appears in Peter K. Clark, "Potential GNP in the United States, 1948-80," *Review of Income and Wealth* (June 1979), pp. 141-65, and in the *Economic Report of the President* for 1977, 1978, 1979, and 1980.

Table 1.—High-Employment and Actual Unemployment Rate and GNP

Year and quarter	Unemployment rate High-employment (1)	Actual (2)	Gap col. (1) less col. (2) (3)	GNP High-employment (potential) (4)	Actual (5)	Gap col. (4) less col. (5) col. (4) (6)	Year and quarter	Unemployment rate High-employment (1)	Actual (2)	Gap col. (1) less col. (2) (3)	GNP High-employment (potential) (4)	Actual (5)	Gap col. (4) less col. (5) col. (4) (6)
1955	4.0	4.4	−0.4	397.2	399.3	−0.5	II	4.4	4.7	−0.3	681.7	678.7	0.4
1956	4.0	4.1	−.1	423.9	420.7	.8	III	4.4	4.4	.1	693.0	695.1	−.3
1957	4.0	4.3	−.3	453.3	442.8	2.3	IV	4.4	4.1	.3	703.0	713.3	−1.5
1958	4.0	6.8	−2.8	476.3	448.9	5.3	1966:						
1959	4.1	5.5	−1.4	508.8	486.5	8.4	I	4.5	3.9	.6	716.0	733.7	−2.4
1960	4.2	5.5	−1.4	520.1	506.0	4.5	II	4.5	3.8	.7	732.2	747.6	−2.1
1961	4.2	6.7	−2.5	553.2	536.2	5.4	III	4.5	3.8	.7	743.6	759.0	−2.1
1962	4.2	5.5	−1.4	582.1	563.8	3.3	IV	4.5	3.7	.8	757.2	771.7	−1.9
1963	4.3	5.7	−1.4	612.6	594.7	3.1	1967:						
1964	4.3	5.2	−.8	647.3	635.7	1.8	I	4.4	3.8	.6	766.7	777.5	−1.1
1965	4.4	4.5	−.1	687.4	688.1	−.1	II	4.4	3.8	.6	778.4	785.5	−.9
1966	4.5	3.8	.7	737.6	753.0	−2.1	III	4.4	3.8	.6	793.0	803.1	−1.3
1967	4.4	3.8	.6	787.3	796.3	−1.1	IV	4.5	3.9	.6	809.0	818.7	−1.2
1968	4.5	3.6	.9	851.8	868.5	−1.9	1968:						
1969	4.5	3.5	1.1	923.6	935.5	−1.0	I	4.5	3.7	.7	826.6	837.3	−1.3
1970	4.7	4.9	−.3	1,010.3	982.4	2.8	II	4.5	3.5	.9	843.5	861.3	−2.2
1971	4.8	5.9	−1.2	1,099.9	1,063.4	3.3	III	4.5	3.5	1.0	858.8	880.0	−2.5
1972	4.9	5.6	−.7	1,166.0	1,171.1	1.3	IV	4.5	3.4	1.1	878.4	894.7	−1.9
1973	4.9	4.9	.1	1,293.3	1,306.6	−.6	1969:						
1974	5.0	5.6	−.6	1,457.7	1,412.9	3.7	I	4.6	3.4	1.2	895.7	913.0	−1.9
1975	5.1	8.5	−3.4	1,655.6	1,528.8	7.7	II	4.6	3.4	1.1	915.9	938.0	−2.5
1976	5.1	7.7	−2.6	1,798.6	1,702.2	5.1	III	4.6	3.6	1.0	937.7	946.9	−1.0
1977	5.1	7.0	−1.9	1,937.6	1,899.5	2.0	IV	4.6	3.6	1.0	957.6	953.3	.4
1978	5.1	6.0	−.9	2,163.2	2,127.6	1.7	1970:						
1979	5.1	5.8	−.7	2,417.3	2,368.8	2.0	I	4.6	4.2	.4	980.5	964.3	1.7
1955:							II	4.7	4.7	−.1	1,001.2	975.5	2.6
I	4.0	4.7	−.7	388.7	387.5	.3	III	4.7	5.2	−.5	1,019.2	992.5	2.6
II	4.0	4.4	−.4	394.1	395.4	−.3	IV	4.7	5.8	−1.1	1,042.1	996.3	4.4
III	4.0	4.1	−.1	400.2	404.0	−.9	1971:						
IV	4.0	4.2	−.2	405.7	410.3	−1.1	I	4.7	5.9	−1.2	1,067.2	1,034.0	3.1
1956:							II	4.8	5.9	−1.1	1,091.7	1,066.3	2.3
I	4.0	4.0	0	412.7	411.9	.2	III	4.8	6.0	−1.2	1,110.6	1,072.4	3.4
II	4.0	4.2	−.2	419.6	417.4	.5	IV	4.8	6.0	−1.2	1,130.1	1,091.3	3.4
III	4.0	4.1	−.1	428.0	423.4	1.3	1972:						
IV	4.0	4.1	−.1	435.2	430.9	1.0	I	4.8	5.8	−.9	1,156.1	1,137.0	2.5
1957:							II	4.9	5.7	−.8	1,274.4	1,156.7	1.5
I	4.0	4.0	0	444.0	439.9	1.1	III	4.9	5.6	−.7	1,196.7	1,191.4	1.1
II	4.0	4.1	−.1	449.6	441.0	1.9	IV	4.9	5.3	−.4	1,218.9	1,215.4	0
III	4.0	4.2	−.2	457.7	446.9	2.1	1973:						
IV	4.0	4.9	−.9	463.1	442.8	4.2	I	4.9	4.8	0	1,247.2	1,265.3	−1.5
1958:							II	4.9	4.8	0	1,279.7	1,288.4	−.7
I	4.0	6.3	−2.3	467.8	435.8	6.8	III	4.9	4.8	.2	1,312.9	1,317.5	−.4
II	4.0	7.4	−3.3	472.9	438.9	7.0	IV	5.0	4.8	.3	1,353.5	1,355.1	−.1
III	4.0	7.3	−3.3	476.6	453.1	5.6	1974:						
IV	4.1	6.4	−2.3	485.1	466.3	3.0	I	5.0	5.1	−.1	1,391.3	1,360.0	1.8
1959:							II	5.0	5.2	−.2	1,440.8	1,400.1	2.8
I	4.1	5.8	−1.7	493.4	476.0	3.5	III	5.0	5.6	−.6	1,491.4	1,430.1	4.1
II	4.1	5.1	−1.0	501.2	489.9	2.2	IV	5.0	6.6	−1.5	1,547.7	1,452.4	6.2
III	4.1	5.3	−1.2	507.3	496.5	4.1	1975:						
IV	4.1	5.6	−1.5	513.5	491.5	3.9	I	5.0	8.3	−3.3	1,599.0	1,454.7	9.0
1960:							II	5.1	9.0	−3.8	1,634.2	1,498.6	8.3
I	4.1	5.1	−1.0	521.3	506.6	2.8	III	5.1	8.5	−3.4	1,675.8	1,564.0	6.7
II	4.1	5.2	−1.1	526.9	506.5	3.0	IV	5.2	8.3	−3.3	1,713.7	1,598.0	6.8
III	4.2	5.6	−1.4	533.4	505.2	5.1	1976:						
IV	4.2	6.3	−2.1	539.0	504.6	6.4	I	5.1	7.7	−2.6	1,741.6	1,652.7	5.0
1961:							II	5.1	7.6	−2.5	1,774.6	1,681.1	5.2
I	4.2	6.8	−2.6	542.9	507.1	6.6	III	5.1	7.7	−2.6	1,806.6	1,715.8	5.1
II	4.2	7.0	−2.8	550.1	518.2	5.8	IV	5.1	7.7	−2.6	1,849.9	1,756.1	5.0
III	4.2	6.8	−2.6	557.2	527.2	5.4	1977:						
IV	4.2	6.3	−2.0	562.9	540.7	3.9	I	5.1	7.5	−2.4	1,890.1	1,830.2	3.7
1962:							II	5.1	7.2	−2.0	1,939.9	1,876.0	3.3
I	4.2	5.6	−1.4	572.4	551.0	3.4	III	5.1	6.9	−1.8	1,977.4	1,930.5	2.4
II	4.2	5.5	−1.3	579.3	562.1	3.0	IV	5.1	6.6	−1.4	2,023.1	1,971.3	2.6
III	4.2	5.6	−1.4	585.9	567.3	3.1	1978:						
IV	4.3	5.5	−1.3	594.6	572.3	3.8	I	5.1	6.2	−1.1	2,069.1	2,011.3	2.8
1963:							II	5.1	6.0	−.9	2,138.2	2,101.2	1.6
I	4.2	5.8	−1.6	602.7	580.2	3.7	III	5.2	6.0	−.9	2,191.4	2,159.8	1.5
II	4.2	5.7	−1.4	609.9	587.9	3.4	IV	5.1	5.8	−.7	2,254.2	2,235.2	.8
III	4.3	5.5	−1.2	616.3	600.5	2.6	1979:						
IV	4.3	5.6	−1.3	626.5	610.4	2.6	I	5.1	5.8	−.6	2,314.4	2,292.1	1.3
1964:							II	5.1	5.8	−.6	2,386.0	2,339.2	2.4
I	4.3	5.5	−1.2	634.3	622.4	1.9	III	5.1	5.8	−.7	2,450.5	2,394.5	2.2
II	4.3	5.2	−.9	642.6	632.4	1.6	IV	5.1	5.9	−.7	2,515.5	2,454.9	2.3
III	4.4	5.0	−.6	652.4	643.1	1.6	1980:						
IV	4.4	5.0	−.6	660.0	646.0	2.1	I	5.1	6.1	−1.0	2,588.9	2,520.3	2.6
1965:							II	5.1	7.5	−2.3	2,672.3	2,521.3	5.7
I	4.4	4.9	−.5	671.8	665.4	1.0							

tion and technology. To construct such a series, the first step is to express real GNP as the working-age population times the ratio of labor force to population times the ratio of employment to labor force times the ratio of real GNP to employment. Each of the three ratios varies cyclically, and high-employment values for each are estimated. The high-employment values for the first two ratios are estimated by adjusting labor force and employment—separately for each of eight sex-age groups—for gaps between levels consistent with the high-employment unemployment rate and actual levels. Real GNP per employee, i.e., productivity, is adjusted for the gap between its high-employment level and its actual level. Because of the sharp deceleration in productivity growth since 1973, the causes of which are only imperfectly understood, this adjustment has been subject to a large margin of error in recent years. Potential real GNP is then derived by substituting the estimated high-employment values of each ratio for actual values. The final step is the smoothing of the estimates by a least-squares trend-line.

Potential GNP in current dollars is equal to potential real GNP multiplied by the implicit price deflator for actual GNP. As elsewhere in the construction of the high-employment budget, it is assumed that the price level at high employment is the same as the actual price level.

Several issues arise in estimating potential GNP.[9] The choice of high-employment unemployment rates could take into account factors in addition to age and sex—for example, education or location. The adjustment equations for labor force, employment, and output per employee could be specified plausibly in different ways, not all of which produce the same cyclical adjustments. The equation for output per employee, for example, resorts to a series of time trends to express all noncyclical

9. For a discussion of some of the issues, see Edward F. Denison, "Changes in the Concept and Measurement of Potential Output in the United States of America," in Joachim Frohn and Reiner Stäglin, eds., Empirische Wirtschaftsforschung: Konzeptionen, Verfahren und Ergebnisse (Berlin: Duncker and Humblot, 1980).

Table 2.—Potential GNP in 1972 Dollars: Percent Change from Preceding Year, Fourth Quarter to Fourth Quarter

Year	Percent change
1955	3.4
1956	3.5
1957	3.5
1958	3.5
1959	3.4
1960	3.5
1961	3.5
1962	3.5
1963	3.8
1964	3.9
1965	3.9
1966	3.8
1967	3.6
1968	3.5
1969	3.5
1970	3.5
1971	3.5
1972	3.5
1973	3.3
1974	3.0
1975	3.0
1976	3.0
1977	3.0
1978	2.6
1979	2.5

Source: Council of Economic Advisers.

changes. No attempt is made to isolate the contribution of the skill-composition of the work force or of the stock of capital. (The latter has been isolated in preparing estimates of potential GNP for the years before 1974.) Finally, the use of a smooth series, rather than a series that incorporates unexplained variations in productivity and labor force, may have some influence on high-employment budget estimates.

Table 1 shows actual current-dollar GNP, potential current-dollar GNP, and the GNP gap. Growth rates of potential GNP in 1972 dollars are shown in table 2. The CEA estimate of the rate of growth for 1979–81 is 2½ percent per year, compared with 3 percent for the 5 preceding years. The persistently poor productivity performance in recent years was the basis for this reduction in the growth rate.

Income shares gross-ups

As noted earlier, the GNP gap is the principal variable used to estimate gross-ups for income shares. A set of equations is estimated in which each dependent variable is an income share, such as wages and salaries divided by GNP, and in which the explanatory variables are current and lagged values of the GNP gap and time trends. For example, the equation for corporate profits is:

$$(1) \quad \left(\frac{CP}{GNP}\right)_t = 0.1211 - .00037 \ (TIME)$$
$$- 0.3928 \ (GNPGAP_t)$$
$$+ 0.0400 \ (GNPGAP_{t-1})$$
$$+ 0.0600 \ (GNPGAP_{t-2})$$
$$+ 0.0181 \ (GNPGAP_{t-3})$$
$$+ 0.0899 \ (GNPGAP_{t-4}) + u_t$$

where:

CP = corporate profits (with inventory valuation and capital consumption adjustments);

GNP = GNP in current dollars;

TIME = 1 in the first quarter of 1948 and increases by 1 each quarter thereafter;

GNPGAP = potential minus actual GNP, divided by potential GNP;

t = the current quarter; $t-1$ a one-quarter lag, etc.;

u = the difference between the actual and estimated share, i.e., the error term.

There are six such equations—one each for wages and salaries, other labor income and employer social insurance contributions, corporate profits, proprietors' income, interest and rental income, and a residual equal to GNP less national income.

Supplementing these share equations are three equations needed to derive a good approximation of tax bases: one for dividends, one for the difference between personal interest income and net interest, and one for the corporate capital consumption adjustment. The specification of these equations differs slightly from the specification of the share equations.

The estimated high-employment value of an income share is derived from its share equation by setting both the current GNP gap and all of the lagged GNP gaps that enter into the equation equal to zero. Thus, for the corporate profits equation, the estimated ratio of corporate profits to potential GNP at high employment is given by:

$$(2) \quad \left(\frac{\widehat{CPK}}{GNPK}\right)_t = 0.1211 - 0.00037 \ (TIME)$$

where:

$\widehat{CPK}$ = estimated high-employment corporate profits;

GNPK = potential GNP in current dollars.

The gross-up method.—In the gross-up method, which—as noted earlier—is one of the innovations used in constructing new estimates, the differences between

estimated high-employment and estimated actual income shares are added to actual income shares to obtain high-employment levels. Earlier methods estimated high-employment levels directly. In what follows, the two methods will be compared, and the advantages of the gross-up method explained, with the corporate profits equations serving as an example.

The earlier method estimated the high-employment profits share by the equation for $(\widehat{CPK/GNPK})_t$. The gross-up method derives the difference between the estimated high-employment share and the estimated actual share by:

$$(3) \quad \left(\frac{\widehat{CPK}}{GNPK}\right)_t - \left(\frac{\widehat{CP}}{GNP}\right)_t$$

$$\begin{aligned} =&\ 0.3928\ (GNPGAP_t) \\ &-0.0400\ (GNPGAP_{t-1}) \\ &-0.0600\ (GNPGAP_{t-2}) \\ &-0.0181\ (GNPGAP_{t-3}) \\ &-.0899\ (GNPGAP_{t-4}) \end{aligned}$$

where $(\widehat{CP/GNP})_t$ is the estimated actual share in quarter t, i.e., the actual share minus the error term u_t. This difference is then added to the actual share, $(CP/GNP)_t$, to obtain the final high-employment share:

$$(4) \quad \left(\frac{CPK_f}{GNPK}\right)_t = \left(\frac{\widehat{CPK}}{GNPK}\right)_t$$

$$- \left(\frac{\widehat{CP}}{GNP}\right)_t + \left(\frac{CP}{GNP}\right)_t$$

where CPK_f is the final value of high-employment corporate profits. Because the last two terms of this equation, $[-(\widehat{CP/GNP})_t + (CP/GNP)_t]$, are equal to u_t, the gross-up estimate can also be expressed as:

$$(5) \quad \left(\frac{CPK_f}{GNPK}\right)_t = \left(\frac{\widehat{CPK}}{GNPK}\right)_t + u_t$$

Clearly, the two methods give different results only when the actual share in quarter t, $(CP/GNP)_t$, differs from the estimated share in quarter t, $(\widehat{CP/GNP})_t$—that is, when the error term u_t differs from zero and therefore when a share equation fails to "explain" the actual share in quarter t. The earlier method ignores this unexplained portion of the actual share; the gross-up method assumes that the unexplained portion would characterize a high-employment economy as well as the actual economy.

The earlier method has the disadvantage that even if the economy is moving along the path of potential GNP, high-employment shares can differ from actual shares. The gross-up method does not have this disadvantage, because the difference between the estimated high-employment share and the estimated actual share—$(\widehat{CPK/GNPK})_t - (\widehat{CP/GNP})_t$, in the case of corporate profits—equals zero when the economy is moving along the path of potential GNP.

More fundamentally, the choice between the two methods should depend on what is the most plausible assumption to make about the nature of the unexplained difference between actual and estimated actual shares (u_t in the corporate profits equation.) If these differences represent transitory disturbances or temporary errors of measurement, then there is a strong case for ignoring them and using the earlier method. But if they represent continuing influences on the distribution of income not captured in the share equations—for example, if they are due to changes in the trend of inflation or in the relative cost of imported materials—then it is probably more accurate to assume that the same differences would characterize a high-employment economy and therefore to use the gross-up method. Past experience with high-employment budget estimates suggests that share equations—because they fail to capture fundamental and persistent shifts in income shares—often develop large and persistent residuals. For this reason, the gross-up method is preferable. Similar reasoning and conclusions apply to the tax receipts equations that are used in estimating the high-employment budget.

Receipts gross-ups

In the construction of receipts gross-ups, the basic ingredients are the income share gross-ups, which provide tax base gross-ups, and tax elasticities, i.e., ratios of percent changes in tax receipts to percent changes in tax base. Each tax elasticity is specified so as to reflect the special features of the tax laws it represents. It is approximately true that, for a receipts category, its tax elasticity times the percent difference between its actual and high-employment tax base equals the percent difference between its actual and high-employment receipts, i.e., its gross-up. More precisely, making use of the mathematical property that for small changes a percent change in a variable is equal to a change in its natural logarithm:

$$(6) \quad \log TK - \log T = \eta(\log BK - \log B)$$

where:

TK = high-employment tax receipts;
T = actual tax receipts;
η = tax elasticity;
BK = high-employment tax base;
B = actual tax base.

From this relation, the dollar level of high-employment receipts is estimated as:

$$(7) \quad TK = T\{e^{(\log TK - \log T)}\}$$

The procedures for estimating the elasticities for each of the major receipts categories are summarized below and discussed in detail in the final section.

Personal taxes.—The elasticity of the personal income tax with respect to personal income is a complex weighted average of four component tax elasticities: for the number of single returns, for the number of nonsingle (largely joint) returns, for average adjusted gross income (AGI) per single return, and for average AGI per nonsingle return. The weights for combining the four elasticities depend on four gaps between actual and high-employment levels, two for the number of returns and two for AGI per return. Each gap is estimated annually, based on relationships between number of returns and employment, and between AGI per return and adjusted personal income per person employed. (Adjusted personal income equals personal income less other labor income and transfer payments to persons plus personal contributions for social insurance as defined

in the national income and product accounts (NIPA's).)

Two of the four tax elasticities—those for the number of returns—are 1.0, holding constant income per return and the distribution of income. The other two are estimated annually on the basis of information on tax liabilities by AGI interval and type of return. For AGI per single return, these tax elasticity estimates range from 1.38 in 1963 to 1.71 in 1977. For AGI per non-single return, the range is from 1.56 in 1968, 1969, and 1970 to 1.73 in 1977. The overall elasticity of the personal income tax derived from the four component elasticities and their weights is fairly stable, ranging from 1.30 in 1968 to 1.47 in 1955. Trends in the underlying components have been largely offsetting.

Corporate profits taxes.—The elasticity of corporate profits taxes with respect to corporate profits is a weighted average of three component elasticities. In the estimation of this elasticity, "corporate profits before tax" is modified to exclude Federal Reserve earnings and rest-of-the-world profits as defined in the NIPA's.

The first elasticity, the elasticity of the average tax rate with respect to income subject to tax, exceeds zero because the rate on the first $100,000 of corporate income is lower than the rate on income above $100,000. Because these tax provisions reduce corporate taxes only slightly, the elasticity is very small, ranging from 0.02 in 1979 to 0.08 in 1955.

The second elasticity, the elasticity of corporate income subject to tax with respect to corporate profits, differs from 1.0 mainly because of corporate losses. Profits equal the profits of corporations with profits minus the losses of other corporations; but only the profits of corporations with profits are taxed. Changes in the ratio of losses to profits therefore affect corporate tax liabilities. The effect of losses is to reduce the elasticity of income subject to tax with respect to profits to a range of 0.76 in 1955 to 0.79 in 1970–79.

The third elasticity, the elasticity of tax credits with respect to corporate profits, is assumed to be 1.0. This elasticity reflects the investment tax credit. The estimation of its elasticity is complicated by numerous legislative

changes and by provisions that allow the credit to be carried forward and backward. An indirect estimate provides a somewhat lower elasticity, but information on credits actually claimed suggests raising that estimate. Small changes in this elasticity do not significantly affect the overall tax elasticity, because tax credits are small relative to liabilities.

The overall elasticity of corporate profits taxes based on these components ranges from 0.79 in 1961, 1962, and 1963 to 0.83 in 1955. Because the range is so small, the mean value of 0.80 is used for all years in high-employment budget calculations.

Indirect business taxes.—The elasticity of indirect business taxes is estimated with respect to real GNP. Demand elasticities of taxed commodities with respect to income are weighted by the commodity composition of indirect business taxes. The overall tax elasticity of indirect business taxes is less than 1, because most of the taxes are on commodities for which demand is inelastic in relation to income. The overall tax elasticity declines from a peak of 0.98 in 1964 to 0.69 in 1973 because of the repeal of several cyclically sensitive excise taxes, particularly the automobile excise tax. Since 1973, an increase in the share of customs duties has raised the tax elasticity to 0.80 in 1979. This elasticity will decline sharply in 1980 and in subsequent years because of enactment of the windfall profits tax, which is expected to be cyclically insensitive.

Contributions for social insurance.—For the estimation of the tax elasticity, contributions for social insurance are disaggregated into four subcategories: (1) Social security contributions, for employees and the self-employed, and railroad retirement contributions; (2) unemployment insurance taxes; (3) Federal civilian employees retirement contributions; and (4) other (supplementary medical insurance premiums, veterans life insurance premiums, and workmen's compensation). Disaggregation is required because the cyclical sensitivity of the subcategories varies significantly and because the relative weight of social security contributions in the total has increased substantially since the 1950's.

For the first subcategory, the elasticity of contributions for employees is a weighted average of a tax elasticity with respect to average wages and a tax elasticity with respect to employment, which is 1.0. The weights are the gaps between actual and high-employment levels of wages and salaries per person employed and of employment. For the self-employed, the tax elasticity is assumed to equal the tax elasticity with respect to average wages just described. For the second subcategory, the tax elasticity is a weighted average of a tax elasticity with respect to average wages and a tax elasticity with respect to employment (also 1.0). The weights are the same as those used for employees in the first subcategory. The remaining subcategories are assumed to be cyclically insensitive.

The tax elasticities change over time. For example, the elasticity of social security contributions (excluding those paid by the self-employed) and railroad retirement contributions has increased during the 1970's from 0.78 in 1971 to 0.90 in 1979, because of the increase in the taxable earnings base relative to average earnings.

Expenditure adjustments

High-employment expenditures are actual budget expenditure levels plus differences between estimated high-employment and estimated actual expenditures for seven cyclically sensitive expenditure categories. These differences are used in the same way as the gross-ups on the receipts side. The term "expenditure adjustment," rather than gross-up, is used to indicate that in many cases the differences are not based on equations estimated for this study but on other studies.

The seven categories for which expenditure adjustments are made together account for slightly more than one-fourth of total Federal spending. Other Federal expenditures were found to be insensitive to cyclical fluctuations, so that actual and high-employment expenditures are equal.[10] Adjustments

10. Cyclical fluctuations do affect one category of other Federal spending, interest payments, in two different ways; both the amount of the debt and interest rates vary cyclically. A study by Robert W. Kilpatrick, "The Full Employment Budget and Interest Outlays," Office of Management and Budget technical staff paper (March 1973), finds these two effects to be approximately offsetting.

for the seven categories are based on either the difference between the actual unemployment rate and the high-employment unemployment rate or on the ratio of the two unemployment levels. When actual unemployment exceeds high-employment unemployment, the adjustments are negative and high-employment expenditures are lower than actual expenditures.

The largest adjustment is for unemployment benefits. The adjustment covers "regular" benefits (generally the first 26 weeks of benefits) and the extended benefits that since 1971 have been provided without special legislation when aggregate unemployment is high. Other extended benefits—special extensions of coverage in the 1974–75 recession and extensions enacted temporarily at various times—are included in high-employment expenditures.

The expenditure adjustment for regular unemployment benefits is based on the sensitivity of these benefits to unemployment. If UIB is actual regular unemployment benefits, and U and UK are the actual and high-employment number of unemployed, respectively, then high-employment regular benefits, $UIBK$, is:

$$(8) \quad UIBK = UIB\left[\left(\frac{UK}{U}\right)^{\lambda}\right]$$

where λ is a parameter reflecting factors, such as the relative earnings of the cyclically unemployed, that cause benefits per unemployed person to vary cyclically. The estimated value of λ is 1.442 when U exceeds UK and 0.922 when U is below UK. When U equals UK, high-employment regular unemployment benefits equal actual regular benefits. At 1979 benefits levels and unemployment rates, the equation indicates that expenditures for regular unemployment benefits increase about $2.4 billion for each percentage point increase in the unemployment rate.

The six additional Federal expenditure categories for which adjustments are made are old-age and survivors benefits, disability benefits, food stamps, aid to families with dependent children, medicaid, and veterans education benefits (GI bill). The adjustments are based on a survey of research on these programs, most of it conducted

within the Federal Government during the last decade. Adjustments for each program are related to current and past values of the unemployment rate. If $(EX)_t$ is the level of the expenditure category in quarter t, and UR and URK are the actual and high-employment unemployment rates, respectively, in quarter t, then the high-employment level of the expenditures in quarter t, $(EXK)_t$, is derived by solving the following equation:

$$(9) \quad \left(\frac{EX}{EXK}\right)_t - 1 = -\sum_{i=0}^{3} b_i(URK_{t-i} - UR_{t-i})$$

where b_i is a constant reflecting the quarterly sensitivity of the expenditure category to changes in the unemployment rate.

For a 1-percentage point increase in the unemployment rate, expenditures in these six categories would increase about $0.9 billion in the first year and $1.5 billion in the second year, at the 1979 level and composition of the programs.

Limitations of the high-employment budget

Although the high-employment budget is superior to the actual budget as a summary measure of the impact of a Federal fiscal program on aggregate demand, it has a number of limitations, which are discussed next.

High-employment budget estimates are made on the assumption that the price level associated with potential GNP is the same as the actual price level; that is, that there is no "price gap" corresponding to the real GNP gap and the unemployment gap. There is general agreement that the high-employment estimates made on this assumption can misstate the extent to which a Federal fiscal program is restrictive or expansionary. Inasmuch as inflation has been high and persistent in recent years, it has become increasingly important to recognize the impact of this assumption on the measures and the limitations that may arise due to it.

Rising prices drive up both receipts and expenditures, but, mainly because of the progressivity of the Federal tax structure and lags in adjusting appropriations to prevailing price levels, the impact on receipts is larger and quicker

than the impact on expenditures. As a result, rising prices tend to push the high-employment budget toward surplus, a movement that may be misinterpreted as a discretionary shift toward restrictiveness.

The expression of high-employment budget levels as a percentage of potential GNP—a form featured in the section of this article that presents the new estimates—improves the high-employment surplus as a summary measure, but does not remove all of the limitations due to inflation. The ratio form is a better measure because it helps eliminate from high-employment receipts and expenditures increases that are due to inflation. However, the ratio form does not eliminate the difference between the receipts impact and the expenditures impact.

The tendency for receipts to increase faster than expenditures is observable not only under conditions of inflation, but also under conditions of real growth. (The tendency, whether due to inflation or to real growth, has often been called "fiscal drag.") The tendency is more pronounced under conditions of real growth than inflation because, although receipts are equally responsive to real growth and to inflation, expenditures tend to be less responsive to real growth. As a result of this tendency, real growth—as well as inflation—tends to push the high-employment budget toward surplus, a movement that may be misinterpreted as a discretionary shift toward restrictiveness. To express the high-employment surplus as a percentage of potential GNP does not eliminate the impact of real growth—just as it did not eliminate the impact of inflation—that is due to the differential impact on receipts and expenditures.[11]

Another limitation stems from the fact that the high-employment surplus or deficit is the sum of all high-employment receipts less the sum of all high-employment expenditures, with

11. Increases in the high-employment budget due to fiscal drag have been used to estimate how much tax receipts would have to be reduced to eliminate the depressing effect of the fiscal drag on economic activity. For instance, if fiscal drag moves the high-employment budget from a deficit of 1 percent of potential GNP to surplus of 0.5 percent, a tax reduction equal to 1.5 percent of potential GNP would be required to restore the initial high-employment surplus in relation to potential GNP, thus eliminating the depressing effect on economic activity.

each dollar weighted equally. The implication is that each dollar has equal impact, positive or negative, on the economy, although it is generally recognized that different categories of spending and taxes have different impacts per dollar. For example, it is likely that a dollar increase in grants to State and local governments has a different impact than a dollar cut in corporate taxes. Accordingly, a high-employment budget that uses different multipliers as weights for different categories of receipts and expenditures would be a better summary measure of the impact of a Federal fiscal program on aggregate demand. Such weights should reflect not only the ultimate impact on the economy, but also the timing of this impact, which probably varies for the different categories. The high-employment budget estimates pre-sented in this article do not use different multipliers as weights because the theoretical and empirical work that has been done does not provide an adequate basis.[12]

The New Estimates

The new estimates of the high-employment surplus or deficit are shown in chart 4 in two different forms. The top panel shows the estimates in billions of dollars; the bottom panel shows them as a percentage of current-dollar potential GNP. The presentation of the new estimates will focus on the ratio form because generally it is more useful to measure fiscal policy in relation to the

12. See Edward M. Gramlich, "Measure of the Aggregate Demand Impact of the Federal Budget," in President's Commission on Budget Concepts, Staff Papers and Other Materials Reviewed by the President's Commission (October 1967), pp. 431-48.

size of the economy. Table 3 shows the dollar levels of actual and high-employment receipts, expenditures, and surplus or deficit, in billions of dollars and as a percentage of GNP. Table 4 shows quarterly and annual changes in the actual and high-employment levels and percentages of GNP.

Comparison of the two panels of chart 5 shows that the quarter-to-quarter changes in the two series are similar. Over longer periods, however, there are significant differences because of growth in potential GNP due both to real growth and to inflation. For example, in dollars, the deficits in 1975-78 are large in relation to deficits in 1965-68 and 1970-73; in ratio form, except for the second quarter of 1975, they are not. The shift from deficit in the third quarter of 1977 to surplus in

CHART 5

High-Employment Surplus or Deficit

CHART 6

High-Employment Surplus or Deficit, Automatic Components of Surplus or Deficit, and GNP: Percentage of Potential GNP
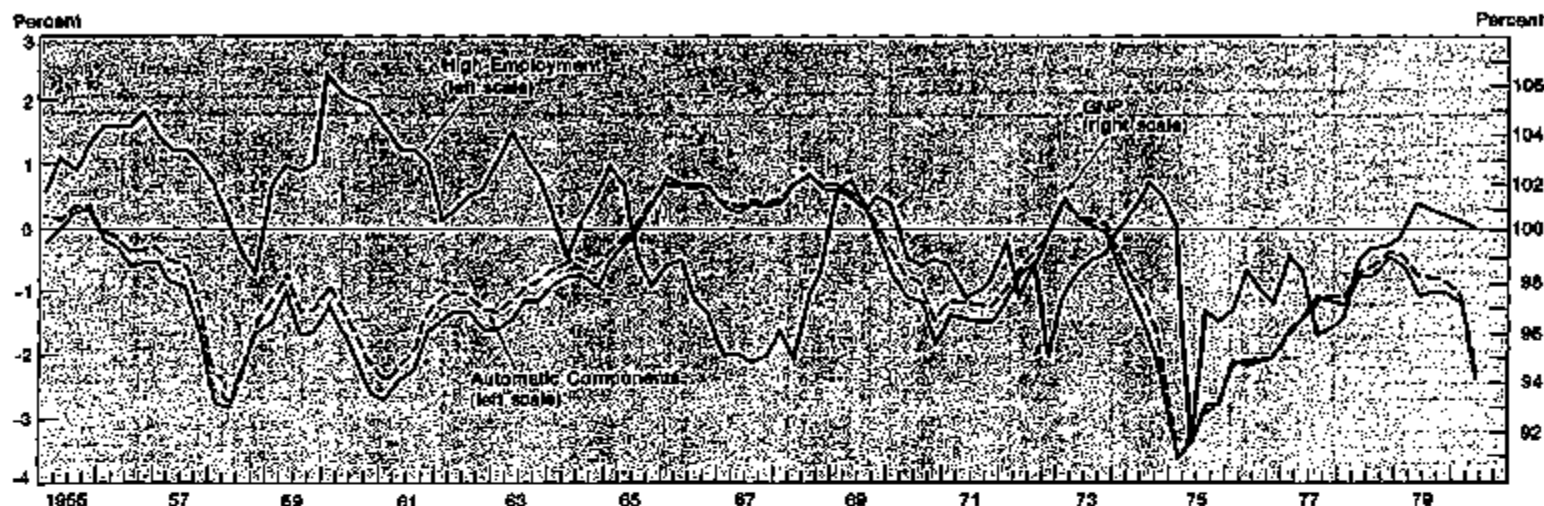
U.S. Department of Commerce, Bureau of Economic Analysis.

CHART 7

High-Employment Receipts and Expenditures: Percentage of Potential GNP
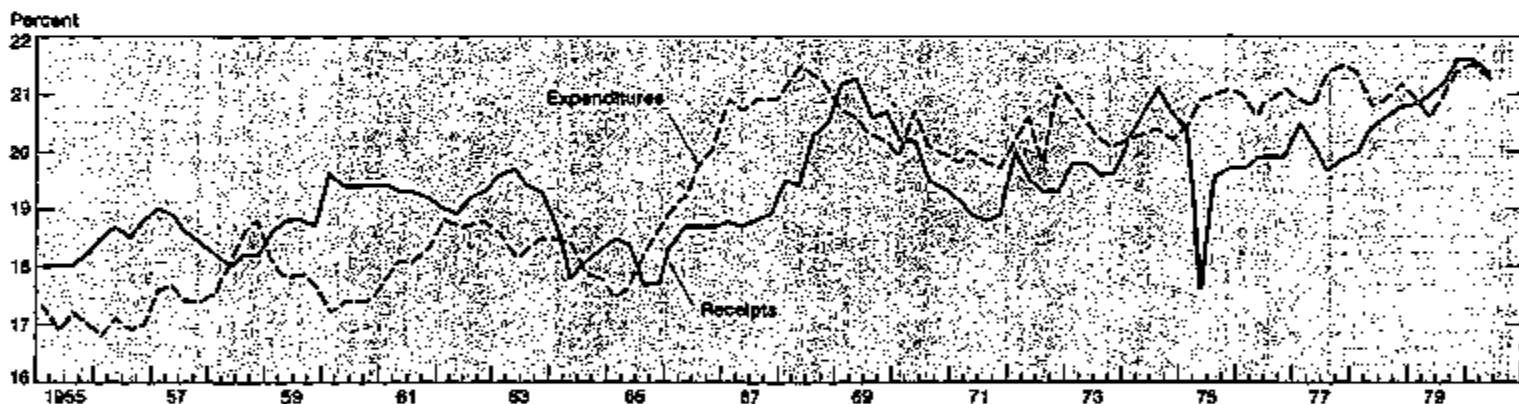
U.S. Department of Commerce, Bureau of Economic Analysis

the second quarter of 1979 is large in dollars, but not in ratio form.[13] In these years, both the dollar and ratio forms reflect the tendency of inflation to push the high-employment deficit toward surplus.

Effect of the budget on the economy.—The high-employment budget estimates can be used to shed light on the effect of the "automatic" and discretionary components of the budget on the economy. The "automatic" surplus or deficit is the difference between the actual and high-employment surplus or deficit, and is shown in chart 6. The automatic surplus or deficit moves closely with the GNP gap, which is the vertical distance between GNP as a percentage of potential GNP and 100 percent. A simulation indicates that, in a recent year, the automatic portion of the budget offset roughly 37 percent of increases in the gap.[14] This 37 percent is a measure of the stabilizing effect of the budget on the economy. Of the 37 percent, about 12 percent was due to the personal income tax, 14 percent to the corporate profits tax, 1 percent to indirect business taxes, and 6 percent to contributions for social insurance. The remaining 4 percent was

13. Quarter-to-quarter changes in the ratio of the high-employment surplus to potential GNP are not the same as, or even similar to, quarter-to-quarter changes in the dollar value of the high-employment surplus divided by potential GNP. If S is the high-employment surplus and P is potential GNP, the change in the ratio is $(S_t/P_t)-(S_{t-1}/P_{t-1})$, while the change in dollars divided by potential GNP equals $(S_t-S_{t-1})/P_t$. The difference between the second and first expressions can be shown to be $(S_{t-1}/P_t)\times[(P_t-P_{t-1})/P_{t-1}]$, which is proportional to the inflation rate. The second procedure is much more sensitive to the inflation rate than the first procedure and, therefore, is a poorer measure of discretionary fiscal policy.

14. The simulation was of the effect of a $10 billion increase in the current-dollar difference between potential GNP and actual GNP in 1977. The high-employment budget was recalculated on the basis of GNP gaps and unemployment gaps that reflected the $10 billion increase. Because most of the share equations and expenditure adjustments involve four lagged quarterly gaps, the full effect of the $10 billion change is reached by the end of one year. The simulated high-employment budget levels were compared with high-employment budget levels without the $10 billion increase to determine the amount of the increase offset by the automatic components of the budget.

Table 3.—Actual and High-Employment Federal Receipts and Expenditures

[Billions of dollars, seasonally adjusted at annual rates]

Year and quarter	Actual						High-employment					
	Receipts		Expenditures		Surplus or deficit (−)		Receipts		Expenditures		Surplus or deficit (−)	
	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP
1955	73.5	18.2	68.1	17.1	4.4	1.1	71.8	18.1	67.9	17.1	3.0	1.0
1956	78.0	18.1	71.9	17.1	6.1	1.4	78.9	18.6	71.9	17.0	7.1	1.7
1957	81.9	18.5	79.6	18.0	2.8	.5	84.9	18.7	79.5	17.5	5.4	1.2
1958	78.7	17.5	88.9	19.8	−10.3	−2.3	88.4	18.1	88.8	18.2	−.4	−.1
1959	89.8	18.5	91.0	18.7	−1.2	−.2	94.2	18.7	88.9	17.9	4.4	.9
1960	96.1	18.9	93.1	18.4	3.0	.6	103.1	19.4	92.0	17.6	11.1	2.1
1961	96.1	18.7	101.9	19.5	−5.9	−.7	106.7	19.3	99.9	18.1	6.7	1.2
1962	106.2	18.8	110.4	18.6	−4.2	−.7	121.4	12.1	109.8	18.7	2.1	.4
1963	114.4	19.2	114.2	19.2	.3	.1	119.8	19.6	112.0	18.4	9.8	1.1
1964	114.0	18.1	118.2	18.6	−3.3	−.5	117.8	18.3	117.4	18.1	.4	.1
1965	124.3	18.1	123.8	18.0	.5	.1	124.0	18.0	123.7	18.0	.4	.1
1966	141.8	18.8	143.6	19.1	−1.8	−.2	137.5	18.6	144.0	18.5	−6.5	−.9
1967	150.5	18.9	163.7	20.6	−13.2	−1.7	148.2	18.8	164.1	20.8	−16.0	−2.0
1968	174.7	20.1	180.6	20.8	−5.9	−.7	169.0	19.9	181.2	21.8	−11.3	−1.3
1969	197.0	21.1	188.4	20.1	8.5	.9	194.3	21.0	189.4	20.4	4.0	.5
1970	192.1	19.6	204.3	20.8	−12.1	−1.2	200.4	19.8	203.8	20.2	−3.4	−.3
1971	198.6	18.7	220.6	20.7	−22.0	−2.1	206.4	19.0	218.0	19.8	−0.6	−.9
1972	227.5	19.4	244.7	20.9	−17.3	−1.5	231.5	19.5	242.8	20.5	−11.4	−1.0
1973	258.3	19.8	265.0	20.3	−6.7	−.5	255.7	19.7	264.9	20.4	−9.0	−.7
1974	288.6	20.4	299.3	21.2	−10.7	−.8	300.6	20.7	297.6	20.8	0.0	.4
1975	286.2	18.7	356.8	23.3	−70.6	−4.6	318.9	19.3	345.1	20.9	−26.2	−1.5
1976	331.4	19.5	385.0	22.6	−53.6	−3.1	358.3	19.9	376.9	20.9	−18.6	−1.1
1977	375.4	19.8	421.7	22.2	−46.3	−2.4	392.0	20.0	414.0	21.1	−22.0	−1.1
1978	432.1	20.3	459.8	21.6	−27.7	−1.3	442.5	20.5	455.9	21.1	−13.4	−.6
1979	487.6	21.0	500.0	21.6	−11.4	−.5	511.7	21.2	506.3	21.0	5.4	.2
1955:												
I	69.7	18.0	67.9	17.5	1.8	.5	68.9	18.0	67.4	17.3	2.5	.6
II	71.6	18.1	66.7	16.9	4.9	1.2	76.9	18.0	66.4	16.9	4.5	1.1
III	73.6	18.2	68.9	17.1	4.9	1.2	72.2	18.0	68.8	17.2	3.4	.9
IV	75.5	18.4	69.0	16.8	6.5	1.6	74.0	18.2	68.0	17.0	5.1	1.3
1956:												
I	76.0	18.5	69.4	15.8	6.6	1.6	74.2	18.5	68.4	16.8	6.8	1.6
II	77.6	18.6	71.8	17.2	5.9	1.4	78.3	18.7	71.7	17.1	6.6	1.6
III	77.6	18.4	72.4	17.1	5.2	1.3	78.3	18.5	72.3	16.9	7.0	1.6
IV	80.5	18.7	74.2	17.2	6.3	1.5	81.9	18.6	74.1	17.0	7.8	1.8
1957:												
I	82.7	18.8	78.1	17.8	4.6	1.0	84.2	19.0	78.1	17.6	6.1	1.4
II	82.5	18.7	79.8	18.1	2.8	.6	85.0	18.0	79.7	17.7	5.3	1.2
III	82.6	18.4	79.8	17.8	2.8	.6	85.3	18.6	79.7	17.4	5.7	1.2
IV	79.8	18.0	81.0	18.3	−1.3	−.3	85.1	18.4	80.3	17.4	4.7	1.0
1958:												
I	76.0	17.4	83.5	19.2	−7.6	−1.7	85.1	18.2	81.8	17.5	3.2	.7
II	76.9	17.3	87.9	20.0	−11.0	−2.7	85.3	18.0	84.9	18.0	.4	.1
III	79.5	17.5	91.6	20.2	−12.1	−2.7	87.0	18.1	89.0	18.6	−2.0	−.4
IV	83.0	17.8	92.0	19.9	−10.0	−2.1	88.1	18.2	91.3	18.9	−3.2	−.7
1959:												
I	87.6	18.4	90.5	19.0	−2.9	−.6	92.8	18.6	89.2	18.1	2.8	.6
II	91.6	18.7	90.1	18.4	1.6	.3	94.3	18.9	89.0	17.8	5.2	1.0
III	89.8	18.6	91.5	18.8	−1.8	−.4	95.2	18.8	90.6	17.9	4.6	.9
IV	90.3	18.3	91.9	18.6	−1.5	−.3	96.0	18.7	90.8	17.7	5.1	1.0
1960:												
I	97.9	19.8	90.2	17.8	7.7	1.5	102.1	19.6	89.4	17.2	12.7	2.4
II	96.5	19.1	92.3	18.2	4.2	.8	102.4	19.4	91.4	17.4	10.9	2.1
III	95.7	18.9	94.2	18.6	1.4	.3	103.4	19.4	93.0	17.4	10.4	1.9
IV	94.5	18.7	95.7	19.0	−1.1	−.2	104.4	19.4	94.0	17.4	10.4	1.9
1961:												
I	94.5	18.6	98.9	19.5	−4.3	−.8	105.0	19.4	96.7	17.8	8.3	1.5
II	96.6	18.6	101.7	19.6	−5.1	−1.0	105.9	19.3	99.3	18.1	6.6	1.2
III	98.9	18.8	102.8	19.5	−3.0	−.7	107.6	19.3	100.8	18.1	6.6	1.2
IV	102.2	18.9	104.4	19.2	−2.2	−.4	108.3	19.2	102.8	18.3	5.4	1.0
1962:												
I	103.4	18.7	109.0	19.7	−5.6	−1.0	108.5	19.0	107.6	18.9	.7	.1
II	105.1	18.7	109.2	19.4	−4.1	−.7	109.7	18.9	108.1	18.7	1.6	.3
III	107.5	18.9	110.7	19.5	−3.2	−.6	112.4	19.2	109.5	18.7	2.8	.5
IV	108.3	19.0	112.3	19.7	−4.1	−.7	115.1	19.3	111.7	18.6	3.4	.6
1963:												
I	111.8	19.2	112.5	19.6	−1.0	−.3	118.1	19.8	112.2	18.6	5.9	1.0
II	114.1	19.4	112.2	19.1	1.9	.3	120.2	19.7	111.0	18.2	9.2	1.5
III	115.3	19.3	114.1	19.8	1.2	.2	119.9	19.4	113.1	18.3	6.8	1.1
IV	116.6	19.1	116.8	19.1	−.2	0	121.0	19.3	115.7	18.6	4.3	.8
1964:												
I	115.4	18.5	118.3	19.0	−3.0	−.5	118.5	18.7	117.3	18.5	1.1	−.2
II	112.1	17.7	118.8	18.8	−6.7	−1.1	114.5	17.8	118.0	18.4	−3.5	−.6
III	115.3	18.0	117.6	18.3	−2.4	−.4	117.8	18.1	117.0	17.9	.8	.1
IV	117.0	18.1	118.0	18.3	−1.0	−.2	120.5	18.3	117.5	17.8	3.1	.5

Table 3.—Actual and High-Employment Federal Receipts and Expenditures—Continued

[Billions of dollars, seasonally adjusted at annual rates]

	Actual						High-employment					
Year and quarter	Receipts		Expenditures		Surplus or deficit (−)		Receipts		Expenditures		Surplus or deficit (−)	
	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP [1]	Amount	Percentage of GNP [1]	Amount	Percentage of GNP [1]
1965:												
I	122.8	18.5	118.2	17.8	4.6	0.7	124.5	18.5	117.8	17.5	6.8	1.0
II	124.4	18.3	120.4	17.7	3.9	.6	125.1	18.4	120.1	17.6	5.0	.7
III	125.1	17.7	128.1	18.1	−3.0	−.4	122.4	17.7	126.1	18.2	−3.7	−.5
IV	127.1	17.8	130.5	18.3	−3.4	−.5	124.1	17.7	130.6	18.6	−6.5	−.9
1966:												
I	136.5	18.6	135.8	18.5	.6	.1	131.8	18.4	136.1	19.0	−4.3	−.6
II	141.3	18.9	140.0	18.7	1.3	.2	136.8	18.7	140.3	19.2	−3.5	−.5
III	143.7	18.9	145.9	19.4	−3.2	−.4	139.3	18.7	147.3	19.8	−8.0	−1.1
IV	145.9	18.9	151.8	19.7	−5.9	−.8	141.9	18.7	152.3	20.1	−10.4	−1.4
1967:												
I	147.1	18.0	159.9	20.6	−12.8	−1.6	144.7	18.6	160.3	20.9	−15.6	−2.0
II	147.6	18.8	160.9	20.5	−13.2	−1.7	145.7	18.7	161.4	20.7	−15.6	−2.0
III	151.5	18.0	165.1	20.0	−13.6	−1.7	149.0	18.5	165.6	20.0	−16.7	−2.1
IV	155.8	19.0	168.9	20.6	−13.0	−1.6	155.3	18.9	169.3	20.9	−16.0	−2.0
1968:												
I	164.1	19.6	172.8	20.8	−8.7	−1.2	161.2	19.6	174.4	21.1	−13.2	−1.6
II	169.1	19.6	181.0	21.0	−12.0	−1.4	164.0	19.4	181.7	21.5	−17.6	−2.1
III	180.3	20.5	182.6	20.8	−2.3	−.3	174.9	20.8	182.3	21.3	−8.3	−1.1
IV	185.4	20.7	184.8	20.7	.7	.1	180.4	20.5	185.7	21.1	−5.3	−.6
1969:												
I	195.6	21.4	184.3	20.2	11.2	1.2	190.2	21.2	185.3	20.7	5.0	.6
II	199.2	21.4	187.2	20.2	12.0	1.3	195.0	21.3	188.1	20.6	6.9	.8
III	196.0	20.7	189.4	20.0	6.7	.7	193.4	20.6	190.3	21.2	3.1	.3
IV	197.1	20.7	192.9	20.3	4.2	.4	198.4	20.7	193.8	21.2	4.6	.5
1970:												
I	193.2	20.0	194.3	20.1	−1.1	−.1	195.3	20.2	194.9	19.9	3.3	.3
II	194.7	19.9	207.5	21.2	−12.8	−1.3	202.3	20.2	207.6	20.7	−5.4	−.5
III	196.5	19.2	205.3	20.7	−14.4	−1.5	196.6	19.5	204.5	20.1	−8.0	−.6
IV	183.5	18.0	209.6	21.0	−26.1	−2.0	202.5	19.4	208.1	20.0	−5.6	−.6
1971:												
I	194.9	18.8	213.5	20.6	−18.5	−1.8	204.4	19.2	211.3	19.8	−6.9	−.6
II	197.1	18.7	220.9	20.9	−23.8	−2.3	206.7	18.9	218.3	20.0	−11.6	−1.1
III	198.6	18.5	222.2	20.7	−23.6	−2.2	208.8	18.8	219.4	19.8	−10.6	−1.0
IV	203.5	18.7	225.9	20.7	−22.3	−2.0	213.8	18.9	223.1	19.7	−9.3	−.8
1972:												
I	222.6	19.6	235.9	20.9	−13.4	−1.2	230.7	20.0	233.2	20.2	−2.3	−.2
II	224.3	19.4	244.2	21.1	−20.0	−1.7	229.1	19.5	241.0	20.6	−12.0	−1.1
III	227.7	19.3	236.5	20.3	−30.8	−.0	231.0	19.3	237.0	19.9	−6.0	−.5
IV	225.3	19.3	260.2	21.3	−34.9	−2.0	234.9	19.3	259.0	21.2	−24.1	−2.0
1973:												
I	252.0	18.9	261.7	20.7	−9.7	−.8	247.0	19.8	261.1	20.9	−14.2	−1.1
II	255.7	19.5	262.2	20.4	−6.6	−.5	252.8	19.8	251.9	20.5	−0.1	−.7
III	259.3	19.7	264.6	20.1	−5.3	−.4	257.7	19.6	254.6	20.2	−0.0	−.5
IV	265.2	18.5	271.5	20.0	−6.3	−.4	255.6	19.6	271.6	20.1	−5.0	−.4
1974:												
I	275.6	20.1	282.1	20.5	−5.6	−.4	281.4	20.2	280.8	20.2	.7	0
II	285.1	20.4	293.7	21.0	−7.6	−.5	297.1	20.6	292.7	20.3	4.4	.3
III	297.0	20.8	306.0	21.4	−8.0	−.6	314.8	21.1	304.2	20.4	10.5	.7
IV	294.8	20.3	316.5	21.8	−21.7	−1.5	320.0	20.7	312.8	20.2	8.9	.6
1975:												
I	287.2	19.7	335.2	23.6	−48.0	−3.3	298.3	20.4	328.0	20.4	.3	0
II	284.3	17.0	354.2	22.6	−99.9	−6.7	287.8	17.0	341.2	20.0	−53.6	−3.3
III	297.6	18.6	363.9	23.3	−66.3	−4.2	328.7	19.6	351.1	21.0	−22.4	−1.3
IV	305.9	19.1	374.1	23.4	−68.2	−4.3	327.1	19.7	352.0	21.1	−24.9	−1.6
1976:												
I	318.0	19.3	375.5	22.8	−57.5	−3.5	343.2	19.7	365.8	21.0	−22.7	−1.3
II	328.2	19.5	375.5	22.3	−47.3	−2.8	352.9	19.0	365.9	20.6	−13.0	−.7
III	335.4	19.5	387.6	22.6	−52.2	−3.0	360.8	18.9	378.0	22.0	−17.2	−1.0
IV	343.1	19.5	400.5	22.8	−57.4	−3.3	368.4	18.9	390.0	21.1	−22.5	−1.2
1977:												
I	365.8	20.2	404.0	22.2	−27.2	−2.0	387.0	20.6	394.8	20.0	−7.2	−.4
II	370.8	19.8	411.6	21.9	−40.9	−2.2	389.0	20.1	403.5	20.8	−14.6	−.7
III	376.8	20.5	429.4	22.8	−53.0	−2.8	389.1	19.7	422.4	21.4	−33.3	−1.7
IV	388.2	19.7	441.8	22.4	−53.6	−2.7	402.9	19.0	435.9	21.5	−32.0	−1.6
1978:												
I	397.5	19.8	447.3	22.2	−49.4	−2.5	413.9	20.0	442.1	21.4	−28.3	−1.4
II	424.8	20.2	449.4	21.4	−24.6	−1.2	435.1	20.4	445.3	20.8	−10.1	−.5
III	442.1	20.5	462.6	21.4	−20.4	−.9	451.6	20.6	458.9	20.9	−7.3	−.3
IV	463.5	20.7	479.7	21.5	−16.3	−.7	469.4	20.9	477.0	21.3	−7.6	−.3
1979:												
I	475.0	20.7	486.8	21.2	−11.7	−.5	482.6	20.8	484.3	20.0	−1.7	−.1
II	485.9	20.9	492.9	21.2	−7.0	−.3	501.1	21.0	490.4	20.6	10.8	.6
III	504.8	21.1	516.1	21.5	−11.3	−.5	520.7	21.3	513.4	20.0	7.4	.3
IV	523.7	21.4	540.4	22.0	−16.7	−.6	542.5	21.6	537.3	21.4	5.1	.2
1980:												
I	538.4	21.4	561.3	22.3	−22.9	−.9	558.0	21.0	537.3	21.5	1.4	.1
II	529.9	21.0	579.1	22.6	−49.2	−2.0	570.8	21.4	569.8	21.3	1.0	0

[1]. Percentages of high-employment GNP.

Table 4.—Changes in Actual and High-Employment Federal Receipts and Expenditures

[Billions of dollars, seasonally adjusted at annual rates]

Changes to year and quarter	Changes in actual budget measures						Changes in high-employment budget measures					
	Receipts		Expenditures		Surplus or deficit (−)		Receipts		Expenditures		Surplus or deficit (−)	
	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP [1]	Amount	Percentage of GNP [1]	Amount	Percentage of GNP [1]
1955	5.4	.3	3.8	0	1.7	.3	7.1	.5	4.0	−.1	3.2	.7
1956	3.9	0	7.7	.9	−3.8	−.9	6.0	.1	7.6	.6	−1.7	−.5
1957	−3.7	−1.0	9.3	1.8	−12.9	−2.8	3.5	−.6	7.3	.7	−3.8	−1.3
1958	11.1	1.0	2.1	−1.1	9.2	3.1	7.9	.6	3.1	−.4	4.8	1.0
1959	8.3	.5	2.1	−.3	4.1	.8	8.8	.7	2.1	−.5	6.7	1.3
1960	2.0	−.3	8.8	1.1	−5.9	−1.5	3.6	−.1	7.9	.8	−4.4	−.9
1961	8.1	.1	8.5	.1	−.3	0	4.7	−.3	9.4	.6	−4.6	−.8
1962	8.2	.4	3.8	−.4	4.5	.8	8.4	.4	3.7	−.3	4.7	.7
1963	.5	−1.1	4.0	−.6	−3.5	−.6	−3.0	−1.3	4.4	−.3	−6.4	−1.0
1965	9.4	0	5.6	−.0	3.8	.8	6.3	−.3	6.3	−.1	0	0
1966	17.5	.7	19.8	1.1	−2.3	−.6	13.5	.5	20.3	1.5	−6.9	−1.0
1967	8.7	.1	20.1	1.5	−11.4	−1.5	10.7	.3	20.1	1.3	−9.5	−1.1
1968	24.2	1.2	16.9	.3	7.4	1.0	21.7	1.1	17.1	.6	4.7	.7
1969	22.3	1.6	7.8	−.7	14.8	1.6	24.4	1.1	8.2	−.0	16.2	1.9
1970	−4.9	−1.3	15.8	.7	−20.6	−2.1	6.1	−1.2	14.4	−.3	−8.3	−.8
1971	6.5	−.9	16.4	−.1	−9.9	−.9	6.0	−.8	14.2	−.4	−8.2	−.6
1972	28.9	.7	24.1	.2	4.7	.6	23.1	.5	24.6	.7	−1.5	−.1
1973	30.8	.4	20.3	−.6	10.6	1.0	24.3	.2	22.0	−.1	2.4	.3
1974	30.3	.6	34.3	.9	−4.0	−.3	47.9	1.0	32.8	−.1	15.0	1.1
1975	−2.4	−1.7	57.5	2.1	−59.9	−3.6	16.3	−1.4	47.5	.5	−31.3	−1.9
1976	45.2	.9	28.3	−.7	17.0	1.5	36.4	.6	30.1	.1	6.4	.4
1977	44.0	.3	30.7	−.4	7.3	.7	35.7	.1	38.8	.3	−3.2	0
1978	56.7	.4	38.1	−.5	18.6	1.1	30.5	.6	41.8	0	8.6	.5
1979	65.5	.7	49.2	−.1	16.3	.6	69.2	.7	50.3	−.2	18.8	.6
1955:												
I												
II	1.9	.1	−1.2	−.6	3.1	.7	1.0	0	−1.0	−.4	2.0	.5
III	2.0	.1	2.2	.2	−.1	0	1.2	0	2.4	.2	−1.1	−.2
IV	1.9	.2	.1	−.3	1.7	.4	1.5	.3	.1	−.2	1.7	.4
1956:												
I	.5	.1	.4	0	.1	0	2.2	.3	.5	−.2	1.7	.3
II	1.6	.1	2.4	.4	−.8	−.2	2.1	.3	2.3	.3	−.2	0
III	0	−.2	.6	−.1	−.6	−.2	1.8	−.2	.6	−.2	.4	0
IV	2.0	.3	1.6	.1	1.1	.3	2.6	.3	1.3	.1	.9	.2
1957:												
I	2.2	.1	3.9	.6	−1.7	−.5	2.3	.3	4.0	.6	−1.7	−.4
II	−.2	−.1	1.7	.3	−1.3	−.4	.3	−.1	1.5	.1	−.8	−.3
III	.4	−.3	0	−.3	0	0	.3	−.3	0	−.3	.4	0
IV	−3.0	−.4	1.2	.5	−4.1	−.9	−.3	−.2	.6	0	−1.0	−.3
1958:												
I	−3.6	−.6	2.5	.0	−6.2	−1.4	0	−.2	1.5	.3	−1.5	−.3
II	−.1	−.1	4.3	.8	−4.4	−1.0	.2	−.2	3.1	.5	−2.8	−.6
III	3.6	.3	3.8	.3	−.2	0	1.7	.1	4.1	.6	−2.4	−.6
IV	3.5	.3	1.4	−.3	2.1	.6	1.1	.1	2.3	.2	−1.2	−.3
1959:												
I	4.6	.6	−2.5	−.9	7.1	1.6	3.9	.4	−2.1	−.7	6.0	1.3
II	4.0	.3	−.5	−.6	4.5	.9	2.3	.2	−.3	−.3	2.4	.4
III	−1.8	−.2	1.6	.4	−3.4	−.7	.9	0	1.6	.1	−.6	−.1
IV	.5	−.2	.4	−.2	.3	.1	.7	−.1	.2	−.2	.5	.1
1960:												
I	7.6	1.0	−1.7	−.8	9.2	1.8	6.2	.9	−1.4	−.5	7.6	1.4
II	−1.4	−.2	2.1	.4	−3.5	−.7	.2	−.2	2.0	.2	−1.8	−.3
III	−.8	−.2	1.0	.4	−2.0	−.5	1.0	0	1.6	0	−.5	−.2
IV	−1.2	−.2	1.5	.4	−2.8	−.5	1.0	0	1.0	0	0	0
1961:												
I	0	−.1	3.2	.5	−3.2	−.6	.6	0	2.7	.4	−2.1	−.4
II	2.1	0	2.9	.4	−.8	−.2	.9	−.1	2.6	.3	−1.7	−.3
III	2.3	.2	1.1	−.1	1.2	.3	1.5	0	1.5	0	0	0
IV	3.3	.1	1.6	−.2	1.7	.3	.9	−.1	2.0	.2	−1.2	−.2
1962:												
I	1.3	−.2	4.6	.4	−3.4	−.6	.2	−.2	5.0	.6	−4.7	−.9
II	1.7	0	.2	−.3	1.5	.3	1.2	−.1	.3	−.1	.9	.2
III	2.4	.2	1.5	.1	.9	.1	2.7	.3	1.4	0	1.2	.2
IV	1.3	.1	2.1	.2	−.9	−.1	2.7	.1	2.2	−.1	.6	.1
1963:												
I	2.8	.2	.7	−.1	2.2	.4	3.0	.3	.5	−.2	2.5	.4
II	2.5	.2	−1.3	−.6	3.8	.6	2.1	.1	−1.3	−.4	3.3	.5
III	1.2	−.2	1.9	−.1	−.7	−.1	−.3	−.2	2.1	.1	−2.4	−.4
IV	1.3	−.1	2.7	.1	−1.4	−.2	1.1	−.1	2.6	.2	−1.5	−.3
1964:												
I	−1.2	−.6	1.5	−.1	−2.6	−.5	−2.5	−.6	1.6	0	−4.2	−.6
II	−3.3	−.8	.5	−.2	−3.7	−.8	−4.0	−.9	.7	−.1	−4.6	−.7
III	3.2	.3	−1.2	−.5	4.3	.7	3.3	.3	−1.6	−.5	4.3	.6
IV	1.7	.1	.4	0	1.4	.2	3.7	.2	.5	−.1	2.3	.4

Table 4.—Changes in Actual and High-Employment Federal Receipts and Expenditures—Continued

[Billions of dollars, seasonally adjusted at annual rates]

Changes to year and quarter	Changes in actual budget measures						Changes in high-employment budget measures					
	Receipts		Expenditures		Surplus or deficit (−)		Receipts		Expenditures		Surplus or deficit (−)	
	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP	Amount	Percentage of GNP [1]	Amount	Percentage of GNP [1]	Amount	Percentage of GNP [1]
1965:												
I	5.8	0.4	0.2	−0.5	5.8	0.9	4.0	0.2	0.3	−0.3	3.7	0.5
II	1.6	−.2	2.2	−.1	−.7	−.1	.6	−.1	2.3	.1	−1.8	−.3
III	−1.8	−.6	5.7	.4	−6.9	−1.0	−3.7	−.7	6.0	.6	−8.7	−1.2
IV	4.0	.1	4.4	.2	−.4	−.1	1.7	0	4.5	.4	−2.8	−.4
1966:												
I	9.4	.3	5.3	.2	4.0	.6	7.7	.7	5.5	.4	2.2	.3
II	4.0	.3	4.2	.2	.7	.1	5.0	.3	4.2	.2	.8	.1
III	2.4	0	6.9	.7	−4.5	−.6	2.5	0	7.0	.6	−4.5	−.4
IV	2.2	0	4.9	.3	−2.7	−.4	2.6	0	5.0	.3	−2.4	−.3
1967:												
I	1.2	0	5.1	.9	−4.9	−.9	2.8	.1	8.0	.3	−5.2	−.5
II	.5	−.1	1.0	−.1	−.4	−.1	1.0	−.1	1.1	−.2	0	0
III	3.9	.1	4.2	.1	−.4	0	3.2	.1	4.2	.2	−1.1	−.1
IV	4.3	.1	3.8	0	.6	.1	4.4	.1	3.7	0	.7	.1
1968:												
I	8.3	.6	4.9	.3	3.5	.4	7.9	.5	6.0	.2	2.6	.4
II	5.0	0	7.3	.2	−2.3	−.3	2.8	−.1	7.4	.4	−4.4	−.5
III	11.2	.9	1.6	−.3	9.7	1.1	10.0	.9	1.6	−.2	8.3	1.0
IV	5.1	.2	2.2	−.1	3.0	.4	6.4	.2	2.4	−.2	4.0	.5
1969:												
I	10.2	.7	−.5	−.5	10.6	1.1	9.8	.7	−.4	−.4	10.3	1.2
II	3.6	0	2.9	0	.6	.1	4.8	.1	2.9	−.1	1.9	.2
III	−3.2	−.7	2.2	−.2	−5.3	−.6	−1.0	−.7	2.2	−.3	−3.8	−.5
IV	1.1	0	3.5	.2	−2.5	−.3	5.0	.1	3.3	−.1	1.5	.2
1970:												
I	−3.9	−.7	1.4	0	−5.3	−.5	−.2	−.5	1.1	−.3	−1.3	−.2
II	1.5	−.1	13.2	1.0	−11.7	−1.2	4.1	0	12.7	.8	−8.7	−.9
III	−3.9	−.7	−2.2	−.6	−1.8	−.2	−3.5	−.7	−2.8	−.6	−.6	−.1
IV	−1.8	−.2	4.3	.3	−6.5	−.5	3.7	−.1	3.3	−.1	.4	.1
1971:												
I	5.4	−.2	3.9	−.4	1.5	.2	1.3	−.2	3.2	−.2	−1.3	−.1
II	2.2	−.1	7.4	.3	−5.3	−.5	2.3	−.3	7.0	.2	−4.7	−.5
III	1.7	−.2	1.3	−.2	.4	.1	2.1	−.1	1.1	−.2	1.0	.1
IV	5.0	.3	3.7	0	1.3	.2	5.0	.1	3.7	−.1	1.3	.2
1972:												
I	13.5	1.1	10.0	.2	3.6	.6	16.0	1.1	10.1	.5	6.8	.6
II	1.7	−.4	5.3	.2	−4.6	−.5	−1.6	−.5	8.8	.4	−10.4	−.9
III	3.4	−.1	−5.8	−.9	9.2	.8	1.9	−.2	−5.0	−.8	6.9	.6
IV	7.6	0	21.6	1.1	−14.1	−1.1	3.9	0	22.0	1.4	−18.1	−1.5
1973:												
I	16.7	.6	1.5	−.6	15.2	1.2	22.1	.5	3.3	−.2	18.9	.9
II	3.7	−.1	.5	−.3	3.1	.3	5.8	0	.8	−.4	5.1	.4
III	3.6	−.1	2.4	−.3	1.4	.1	4.9	−.2	2.7	−.3	2.3	.2
IV	5.9	−.1	6.0	−.1	−.1	0	7.3	0	7.0	−.1	1.0	.1
1974:												
I	9.4	.6	9.6	.5	−.2	0	15.8	.6	9.3	.1	6.6	.4
II	10.5	.8	12.6	.6	−2.1	−.1	15.7	.4	11.9	.1	3.7	.3
III	11.9	.4	12.3	.4	−.4	−.1	17.7	.5	11.6	.1	6.1	.4
IV	−8.1	−.5	10.5	.4	−18.7	−.9	6.1	−.4	9.3	−.2	−2.2	−.2
1975:												
I	−7.6	−.6	18.7	1.2	−26.2	−1.8	6.3	−.3	13.4	.2	−8.1	−.5
II	−22.9	−2.7	19.0	.6	−41.9	−3.4	−38.6	−2.8	15.2	.5	−53.8	−3.3
III	43.3	2.0	9.7	−.3	33.6	2.6	41.1	2.0	9.9	.1	31.2	2.0
IV	8.3	.1	10.2	.2	−1.9	−.1	8.4	.1	10.9	.1	−2.5	−.2
1976:												
I	13.1	.2	2.4	−.6	10.7	.8	6.1	0	2.8	−.1	3.2	.2
II	9.3	.2	−1.0	−.5	10.3	.7	9.7	.2	.1	−.6	9.7	.6
III	7.2	0	12.1	.3	−4.9	−.2	7.0	0	12.1	.3	−4.2	−.3
IV	7.7	0	12.9	.2	−5.2	−.3	7.6	0	12.9	.2	−6.3	−.2
1977:												
I	23.7	.7	3.5	−.6	20.2	1.3	19.2	.6	4.0	−.2	15.3	.8
II	4.0	−.4	7.6	−.3	−3.7	−.3	1.4	−.4	8.6	−.1	−7.3	−.3
III	5.0	−.2	17.4	.3	−12.7	−.6	.1	−.4	18.9	.6	−18.8	−1.0
IV	12.4	.2	12.4	.2	0	.1	13.2	.2	12.8	.2	.4	.1
1978:												
I	9.6	.1	5.5	−.2	4.2	.2	11.5	.1	6.9	−.1	4.6	.3
II	27.0	.4	5.1	−.6	21.9	1.3	31.3	.4	3.3	−.6	18.2	.9
III	17.5	.2	13.3	0	4.2	.3	16.5	.2	13.6	.1	2.6	.2
IV	21.4	.2	17.1	.1	4.1	.2	17.8	.2	18.1	.3	−.3	0
1979:												
I	11.5	0	7.1	−.3	4.5	.2	13.3	0	7.3	−.2	5.9	.2
II	10.8	.2	6.1	0	4.7	.2	18.5	.2	6.1	−.3	12.5	.6
III	19.0	.3	23.3	.3	−4.3	−.2	19.6	.3	23.0	.3	−3.4	−.3
IV	19.0	.3	24.5	.5	−4.4	−.1	21.5	.3	23.9	.5	−2.3	−.1
1980:												
I	13.7	0	20.9	.3	−7.2	−.3	16.1	0	19.9	.1	−3.7	−.1
II	−8.5	−.4	17.8	.7	−26.3	−1.1	12.3	−.2	12.8	−.2	−.4	−.1

1. Percentages of high-employment GNP.

Table 5.—Components of High-Employment Federal Receipts and Expenditures

[Billions of dollars, seasonally adjusted at annual rates]

Year and quarter	Receipts					Expenditures				
	Total	Personal tax and nontax receipts	Corporate profits tax accruals	Indirect business tax and nontax accruals	Contributions for social insurance	Total	Transfer payments		Grants-in-aid to state and local governments [3]	All other expenditures [2]
							Total [1]	Unemployment insurance benefits		
1955	71.8	31.5	20.3	10.6	9.4	67.9	14.3	1.4	3.1	50.6
1956	78.9	35.4	21.6	11.4	10.7	71.9	15.2	1.5	3.3	53.4
1957	84.9	38.5	21.9	12.1	13.6	79.5	17.8	1.7	4.3	57.9
1958	86.4	38.9	21.2	12.1	13.0	86.8	19.2	1.9	5.6	61.9
1959	94.3	42.2	22.8	12.9	15.4	89.9	21.0	1.8	6.8	62.2
1960	102.1	46.6	24.2	14.0	18.3	92.0	22.3	2.9	6.5	63.1
1961	106.7	48.6	24.5	14.3	19.2	99.9	25.1	2.6	7.3	67.6
1962	111.4	51.4	23.8	15.1	21.2	109.3	26.6	2.6	7.9	74.7
1963	118.6	54.1	24.2	15.7	24.7	113.0	28.1	3.0	9.1	75.8
1964	117.8	50.1	26.8	15.5	24.3	117.4	29.8	3.3	10.4	77.7
1965	124.0	54.8	28.2	16.5	25.1	123.7	32.9	3.3	11.1	80.3
1966	137.5	66.0	29.6	16.3	22.6	144.0	34.1	2.2	14.4	95.5
1967	148.3	66.2	29.6	16.1	34.3	164.5	40.7	2.6	16.0	108.4
1968	169.9	77.7	34.4	17.7	40.2	181.3	46.7	2.7	18.6	113.9
1969	194.3	90.2	36.9	16.6	46.4	180.4	53.4	2.6	20.4	115.0
1970	200.4	95.1	34.1	19.6	40.6	203.8	63.3	3.7	24.5	116.3
1971	208.4	94.3	35.9	21.0	56.5	218.0	72.8	4.0	29.9	116.4
1972	231.5	112.9	35.6	20.2	63.6	242.8	81.5	4.1	37.4	124.0
1973	255.7	133.9	41.5	21.1	79.2	254.8	85.6	4.4	40.5	128.6
1974	303.6	136.7	52.5	22.3	92.1	297.6	115.9	5.4	43.9	127.8
1975	319.9	140.3	53.2	25.4	101.1	345.1	137.9	8.1	54.1	153.1
1976	356.3	160.3	59.6	24.3	112.3	375.2	132.5	5.6	60.4	162.3
1977	392.0	178.9	64.4	25.7	123.0	414.0	165.7	5.6	66.9	181.6
1978	442.5	200.6	73.5	28.5	139.7	455.6	181.8	5.6	77.0	197.1
1979	511.7	226.9	82.0	30.5	162.3	504.3	207.3	7.7	80.3	215.8
1955:										
I	68.9	30.5	20.1	10.2	8.1	67.4	14.2	1.6	3.0	50.2
II	70.9	31.1	19.8	10.8	9.2	66.4	14.1	1.4	3.1	49.2
III	72.2	31.7	20.2	10.8	9.6	68.8	14.8	1.4	3.3	51.3
IV	74.0	32.5	21.1	10.7	9.6	68.9	14.8	1.3	3.2	51.5
1956:										
I	76.2	33.7	21.3	10.9	10.3	69.4	14.7	1.5	3.1	51.6
II	78.3	35.1	21.9	11.0	10.4	71.7	15.0	1.4	3.3	53.5
III	79.3	35.0	21.3	11.4	10.9	73.3	15.4	1.8	3.5	53.4
IV	81.9	36.6	21.9	12.1	11.1	74.1	15.6	1.5	3.5	55.0
1957:										
I	84.2	37.6	22.4	12.0	12.3	75.1	16.2	1.8	4.2	57.3
II	85.0	38.5	22.0	12.0	12.5	77.7	17.7	1.7	4.0	56.1
III	85.3	38.9	21.6	12.2	12.7	79.7	17.4	1.7	4.3	56.1
IV	85.1	39.2	21.4	11.9	12.6	80.3	18.1	1.9	4.5	57.7
1958:										
I	85.1	39.7	20.5	12.1	12.7	81.3	18.3	1.8	4.8	58.7
II	85.3	39.4	20.7	12.8	12.5	84.9	18.8	2.1	5.6	60.5
III	87.0	40.4	21.4	12.0	13.2	89.6	19.7	1.8	5.4	63.9
IV	88.1	40.1	22.6	12.2	13.1	91.3	20.0	1.7	5.6	64.5
1959:										
I	92.0	41.0	23.2	12.5	15.3	89.2	20.5	1.7	6.7	62.1
II	94.3	41.5	24.6	12.7	15.4	89.0	20.7	1.9	6.4	61.9
III	95.2	42.6	23.8	13.3	15.6	90.6	21.0	1.8	7.5	62.2
IV	95.9	43.6	23.5	13.3	15.6	90.5	21.6	1.9	6.6	62.3
1960:										
I	102.1	44.8	25.2	14.0	18.0	89.4	21.4	1.9	6.2	61.8
II	102.4	46.1	24.0	14.0	18.2	91.4	22.1	2.0	6.6	62.7
III	103.4	47.2	23.6	14.1	18.4	92.0	22.7	2.1	6.7	63.7
IV	104.4	48.2	23.8	14.1	18.6	94.0	23.1	2.1	6.6	64.2
1961:										
I	105.0	48.6	23.5	14.1	18.9	96.7	24.3	2.1	7.2	65.2
II	105.9	48.6	24.2	14.3	19.1	79.3	25.0	2.1	7.2	67.2
III	107.4	48.6	25.0	14.3	19.3	100.6	25.4	1.9	7.3	68.3
IV	108.8	49.7	25.6	14.6	19.4	102.6	25.6	1.8	7.3	72.0
1962:										
I	108.5	49.4	23.3	14.9	21.0	107.3	26.4	2.0	7.7	72.6
II	109.7	50.6	23.0	14.8	20.3	105.1	26.1	1.9	7.9	74.1
III	112.4	51.9	24.1	15.2	21.1	106.5	26.6	2.0	7.9	75.1
IV	115.1	53.5	24.9	15.3	21.3	111.7	27.4	2.1	8.2	76.1
1963:										
I	116.1	54.1	25.2	15.5	21.4	113.2	28.2	2.0	8.5	76.6
II	120.2	54.3	26.5	15.7	23.7	111.0	27.5	2.0	8.8	74.7
III	119.9	54.0	26.4	15.8	23.8	113.1	28.0	2.1	9.4	76.8
IV	121.0	54.2	26.0	16.9	24.1	115.7	28.7	2.1	9.9	77.3
1964:										
I	118.5	52.1	26.5	15.9	24.0	117.3	29.3	2.0	10.1	78.1
II	114.6	47.8	28.3	16.3	24.2	118.0	29.1	2.3	10.4	78.5
III	117.6	48.4	27.2	16.7	24.4	117.0	28.5	2.3	10.5	77.4
IV	120.5	51.3	27.3	17.3	24.6	117.5	29.7	2.3	10.7	77.0

Table 5.—Components of High-Employment Federal Receipts and Expenditures—Continued

[Billions of dollars, seasonally adjusted at annual rates]

Year and quarter	Receipts					Expenditures				
	Total	Personal tax and nontax receipts	Corporate profits tax accruals	Indirect business tax and nontax accruals	Contributions for social insurance	Total	Transfer payments		Grants-in-aid to state and local governments [2]	All other expenditures [3]
							Total [1]	Unemployment insurance benefits		
1965:										
I	124.5	54.5	27.7	17.6	24.8	117.9	39.7	2.1	10.5	76.5
II	125.1	56.3	28.2	16.8	25.0	120.1	39.9	2.2	11.0	78.2
III	132.4	58.4	28.1	15.8	25.3	128.1	34.4	2.4	11.3	80.5
IV	124.1	54.0	28.6	15.9	25.6	120.5	33.4	2.4	11.5	85.6
1966:										
I	131.5	56.3	29.3	14.8	31.7	136.1	35.1	2.3	13.3	87.5
II	135.5	59.6	29.5	15.4	33.1	140.3	34.4	2.1	14.4	91.6
III	139.3	61.1	29.7	15.6	34.2	147.3	39.0	2.3	14.9	96.4
IV	141.9	63.3	29.4	15.7	30.5	153.3	39.0	2.3	15.0	98.2
1967:										
I	144.7	64.6	29.4	15.8	35.0	160.3	41.7	2.4	15.3	103.3
II	145.7	64.5	29.2	16.2	35.0	161.4	42.3	2.7	14.9	104.1
III	148.9	67.1	28.9	16.1	36.6	165.6	43.4	2.6	16.0	106.1
IV	153.3	68.7	30.7	16.3	37.6	168.3	43.4	2.5	17.5	108.4
1968:										
I	161.2	70.6	34.5	17.0	39.1	174.9	45.3	2.7	17.8	111.3
II	164.0	72.5	33.9	17.5	39.9	181.7	48.5	2.4	18.8	114.3
III	174.0	81.9	33.5	18.0	40.5	183.3	49.9	2.7	18.9	114.6
IV	180.4	85.4	35.4	18.2	41.3	185.7	51.1	2.9	19.0	115.5
1969:										
I	190.2	91.3	38.0	18.2	44.7	185.3	51.9	3.0	19.2	114.3
II	195.0	94.5	34.0	18.7	45.5	188.1	53.5	2.8	19.9	114.7
III	193.4	92.2	35.0	19.2	47.0	190.3	53.6	2.9	20.5	116.2
IV	198.4	94.6	36.6	19.1	48.1	193.8	54.7	3.3	22.1	117.0
1970:										
I	198.3	95.2	34.2	18.3	48.6	194.9	56.5	3.2	23.0	115.6
II	202.3	97.2	34.3	19.7	50.4	207.6	63.2	3.8	24.1	118.4
III	198.5	92.5	35.6	19.8	51.1	204.8	64.5	3.9	24.8	115.4
IV	202.5	95.5	35.7	20.3	51.1	208.1	64.7	4.0	25.4	116.0
1971:										
I	204.4	90.9	34.7	21.5	53.5	211.3	67.3	3.7	27.1	116.9
II	206.7	92.7	37.3	20.7	54.1	216.3	74.2	4.0	29.0	115.0
III	208.8	94.5	38.8	20.7	55.5	218.4	74.3	4.1	29.0	116.2
IV	212.5	96.5	38.6	21.0	57.3	228.1	75.4	4.3	30.4	117.4
1972:										
I	220.7	110.9	36.5	20.0	63.4	233.2	77.7	4.0	31.4	124.0
II	229.1	110.3	34.5	19.0	63.4	242.0	78.2	4.3	38.5	125.3
III	231.0	110.6	36.8	20.2	64.0	237.0	78.7	4.1	33.9	123.4
IV	234.9	111.6	28.3	20.0	64.4	259.0	90.2	4.1	45.6	123.3
1973:										
I	247.0	109.5	39.4	20.9	77.2	261.1	91.7	4.3	41.4	126.2
II	252.8	110.7	42.3	31.5	78.3	261.9	94.8	4.1	40.4	126.7
III	257.7	115.6	41.4	20.8	79.6	264.0	96.8	4.5	40.0	127.3
IV	265.6	119.6	43.1	21.2	81.5	271.6	99.5	4.6	40.3	131.8
1974:										
I	281.4	125.1	46.8	21.6	87.9	280.8	100.7	5.3	42.7	131.4
II	297.1	133.0	51.3	22.0	90.8	292.7	113.0	5.3	42.5	135.4
III	314.8	140.9	57.4	22.6	93.0	304.3	119.5	5.3	43.7	141.0
IV	320.0	147.0	64.6	23.0	95.8	312.6	123.0	5.6	45.7	143.3
1975:										
I	326.2	154.4	49.3	28.4	99.1	328.0	129.1	6.3	46.7	147.4
II	287.6	112.2	50.6	24.8	100.0	341.2	137.4	6.7	53.6	150.3
III	328.7	144.0	54.2	20.6	101.5	351.1	140.9	6.0	50.0	164.3
IV	337.1	149.7	56.5	27.0	103.7	352.0	143.0	5.6	57.4	160.7
1976:										
I	343.2	150.6	63.9	23.6	110.0	365.8	148.6	5.8	56.3	158.6
II	352.0	157.4	60.6	24.1	111.3	365.9	146.1	5.3	56.5	159.3
III	360.8	162.1	60.4	24.7	112.7	378.0	153.6	5.4	60.1	163.4
IV	369.4	168.5	59.3	24.8	114.7	390.9	157.5	5.7	64.6	168.6
1977:										
I	387.5	179.2	62.8	25.1	120.3	304.9	158.9	5.6	62.0	172.0
II	388.0	176.7	64.7	25.4	122.1	403.5	161.5	5.6	64.8	177.2
III	393.1	175.7	63.9	25.1	123.3	422.4	160.3	5.8	70.5	182.5
IV	402.3	184.1	65.6	26.0	126.0	435.2	172.0	6.1	60.8	183.4
1978:										
I	414.8	197.0	63.9	27.2	125.7	443.1	176.1	6.8	73.9	193.1
II	435.1	194.0	73.2	28.4	138.6	455.3	177.0	6.5	78.3	192.0
III	451.0	206.4	75.9	28.7	140.6	458.9	185.6	6.8	77.2	196.1
IV	462.4	215.1	61.1	29.5	142.5	477.0	189.7	6.8	80.4	207.0
1979:										
I	482.6	217.4	78.1	20.7	167.5	484.3	194.4	7.3	77.8	212.1
II	501.1	230.3	79.8	30.5	160.4	490.4	199.0	7.3	77.5	213.3
III	520.7	242.8	82.9	30.5	163.4	513.4	215.1	7.9	81.5	216.0
IV	542.6	257.1	64.4	31.3	167.7	537.3	219.0	8.2	84.1	233.4
1980:										
I	568.6	265.7	92.5	34.5	175.9	557.2	235.1	8.6	85.8	245.3
II	570.8	258.7	78.2	44.4	179.5	569.8	233.5	8.6	85.6	257.4

Table 6.—Composition of High-Employment Receipts

[Percentages of total]

	1959	1969	1979
Personal taxes	45	45	45
Corporate profits taxes	25	18	15
Indirect business taxes	14	10	6
Contributions for social insurance	16	24	32
Total	100	100	100

due to unemployment insurance and other expenditure programs. The percentage offset has changed very little over time, although the importance of some of the components has changed. A comparable estimate for the 1948–49 recession was 38 percent.[15]

The high-employment surplus or deficit has sometimes followed the automatic surplus or deficit with only a brief lag, reflecting the enactment of discretionary policies intended to stabilize the economy. Such was the case, for example, in the recessions of 1957–58, 1970–71, and 1974–75. On these occasions, the high-employment budget moved from surplus into deficit while the economy was in a recession. At

15. See Committee for Economic Development, *The Stabilizing Budget Policy* (New York: Committee for Economic Development, 1950), p. 15. CED estimates for the 1980's, however, when tax rates were much lower than after World War II, were far below 38 percent.

other times, however, movements in the high-employment budget have not been in a stabilizing direction. From 1965 to 1967, for example, expenditure increases pushed the high-employment budget sharply into deficit, although the economy was expanding strongly.

Chart 6 suggests that a rise in the high-employment surplus generally precedes economic downturn (decline in GNP as a percentage of potential GNP), and that a fall in the surplus or increase in the deficit generally precedes expansion (increase in GNP as a percentage of potential GNP). All downturns were preceded by increases in the high-employment surplus, and the long expansion of 1961–68 was accompanied by a movement from surplus toward deficit. These results must, of course, be interpreted in the light of the limitations of the high-employment budget.

Changes in high-employment receipts and expenditures.—The components of high-employment receipts and expenditures are shown in table 5. There have been sizable changes over time in their composition. The share of personal taxes in high-employment receipts has remained fairly stable, but the share of corporate profits taxes has declined sharply (table 6). The decline in the share of corporate profits taxes reflects the declining share of corporate profits

Table 7.—Composition of High-Employment Expenditures

[Percentages of total]

	1959	1969	1979
Unemployment insurance	2	2	2
Other expenditures for which expenditure adjustments are made	12	17	25
All other expenditures	86	81	73
Total	100	100	100

in GNP, as well as reductions in the statutory rate and the introduction of the investment tax credit in 1962. The share of indirect business taxes declined through 1979, due to the repeal of a number of excise taxes and to their being specific rather than ad valorem for many commodities. Enactment of the windfall profits tax is causing the indirect business tax share to increase beginning in 1980. Increases in tax rates and expanded coverage have increased the share of contributions for social insurance.

The share of cyclically sensitive categories of expenditures—i.e., those for which expenditure adjustments are made—has grown at the expense of other expenditures (table 7). All categories of cyclically sensitive expenditures have shared in the expansion.

The fluctuations in the trends of high-employment receipts and expenditures suggest that receipts have super-

CHART 6

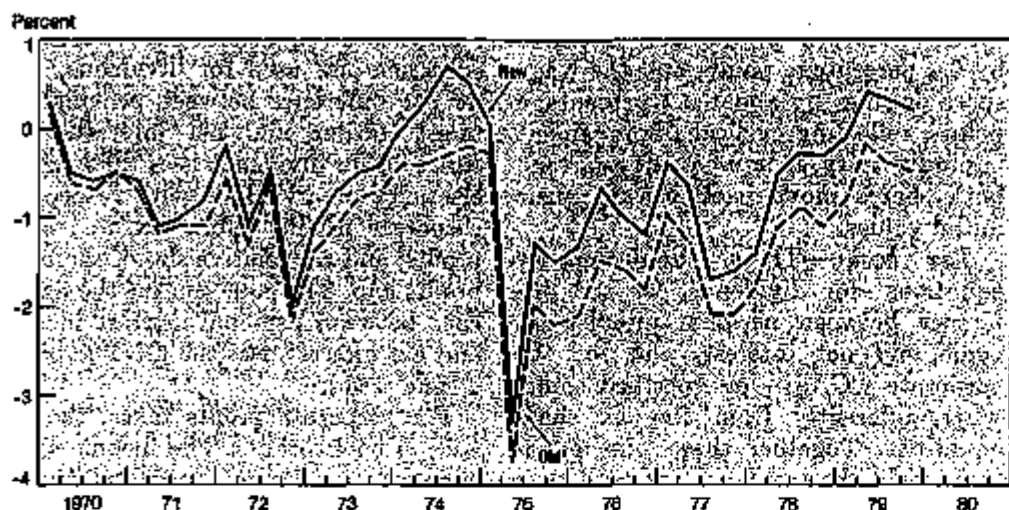High-Employment Surplus or Deficit Based on Potential GNP and Based on a Moving Average of GNP

CHART 9

Old and New Methodology: High-Employment Surplus or Deficit as a Percentage of Potential GNP, 1970-79

Percent

1. Old refers to the OBA method used in the 1979 Economic Report of the President.

U.S. Department of Commerce, Bureau of Economic Analysis

Income shares

Income share equations are used to provide estimates of tax bases as part of both the gross-up method, which is used in preparing the new estimates, and the method used earlier. In the method used earlier, the equations are used to provide an estimate of shares, and of bases, only at high-employment. In the gross-up method, these equations are used to provide estimated actual shares as well. The difference between each estimated high-employment share and the corresponding estimated actual share is used to calculate an income gap corresponding to the GNP gap.

GNP is disaggregated as follows to permit the generation of tax bases:

1. Wages and salaries
2. Other labor income and employer contributions for social insurance
3. Corporate profits with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj)
4. Proprietors' income with IVA and CCAdj
5. Rental income of persons with CCAdj and net interest
6. GNP less national income

Equations for each of these six categories divided by GNP are estimated jointly.

Estimation.—The specification of the income share equations is limited to a constant term, a time trend, and current and lagged values of the GNP gap, which represent cyclical variables. No attempt is made to derive a specification based on a full-scale theory of income distribution, although an autocorrelation correction is employed in an attempt to control for other systematic factors affecting income shares.

The estimation procedure used for the six categories of GNP also recognizes that different income shares are influenced by the same random factors and that the sum of the income shares is equal to unity. Specifically, the estimation procedure consists of: (1) obtaining consistent estimates of the autocorrelation coefficients using nonlinear least squares on each equation

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seded expenditures as the main tool of fiscal policy. In the 1950's and most of the 1960's, as chart 7 shows, expenditures as a percentage of potential GNP fluctuated substantially around an upward trend, while receipts fluctuated somewhat less around a less pronounced trend. In the 1970's, in contrast, expenditures fluctuated less than receipts.

Sensitivity tests.—To test the sensitivity of the high-employment budget estimates to alternative methodologies, the estimates presented in this article are compared with those derived using a centered 5-year moving average of real GNP instead of potential GNP. The new estimates are also compared with those derived using the earlier method, which estimated high-employment receipts directly, rather than using a gross-up approach, and which confined expenditure adjustments to unemployment benefits.

The results of the first comparison are shown in chart 8.[16] Quarter-to-quarter movements in the high-employment budget are affected very little by the substitution. Over longer intervals, however, there are some

differences. The estimates based on a moving average indicate a less pronounced shift from a restrictive to an expansionary policy during the 1960's and indicate a more expansionary fiscal policy relative to earlier periods since the 1975 recession.

The results of the second comparison are shown in chart 9. In a few periods—notably the move from deficit in 1973 to surplus in 1974—the estimates are sensitive to the methodology employed. The new expenditure adjustments contribute to these differences. On the receipts side, the largest differences are for corporate profits, where the new methodology both raises the average high-employment level and increases the amplitude of fluctuation.

Detailed Methodology

The section "Overview of the Methodology" summarized the steps in constructing the new estimates of the high-employment budget. The discussion that follows describes in detail the estimation of (1) income shares and tax bases; (2) the four receipts categories, with special emphasis on the tax elasticity estimates that are used to convert tax base gross-ups to receipts gross-ups; and (3) the expenditure adjustments.

16. The moving averages for 1978 and 1979 employ OBA projections (made in March 1980) of real GNP for 1980 and 1981. Also, a moving-average unemployment rate is substituted for the high-employment rate.

for the first five categories (omitting the sixth, GNP less national income); (2) transforming the data in each equation using the conventional autoregressive transformation procedure in order to minimize serial correlation; (3) re-estimating the transformed equations using an iterative version of Zellner's technique for "seemingly unrelated" equations; and (4) calculating the co-efficients for the GNP less national income equation as a residual, requiring that the sum of the constant terms in all six equations equal one and that the sum of the coefficients for each variable in all six equations equal zero.[17] The estimation period is from the first quarter of 1955 to the fourth quarter of 1979. Table 8 shows the final estimated equations.

The estimates in table 8 suggest that the profits share of GNP is the most procyclical of all shares; the wages and salaries share is also procyclical. Proprietors' income shows no evidence of cyclicality. The residual share, consisting largely of indirect business taxes and the capital consumption allowance with CCAdj, is strongly countercyclical. Its countercyclicality may reflect, in part, attempts by State and local governments to augment their receipts from indirect business taxes, such as sales and property taxes, during cyclical downturns.

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17. Zellner's technique is computationally equivalent to maximum likelihood estimation (given the initial consistent estimate of the autocorrelation parameters). As a consequence, the coefficients estimated do not depend on which equation was omitted. See Arnold Zellner, "Estimates for Seemingly Unrelated Regression Equations: Some Exact Finite Sample Results," *Journal of the American Statistical Association*, vol. 58 (December 1963), pp. 977–92. The estimates shown here are quite similar to the initial nonlinear least squares estimates, suggesting that the cross-equation correlations of the disturbance terms in the transformed equations are not large.

The dynamic behavior of the wage and profits shares is characterized by overshooting. The first quarter after the GNP gap is narrowed by 1 percentage point, the profits share increases by 0.4 percentage points and the wage share declines by about 0.2 percentage points, reflecting cyclical improvement in productivity. In subsequent quarters, both shares move back toward their initial values.

Tax bases.—Three supplementary equations—for dividends, for the difference between personal interest income and net interest, and for the corporate CCAdj—are specified somewhat differently from the six share equations. Together these nine equations yield the tax bases for each type of receipt as defined in the NIPA's.

For personal tax and nontax payments, the tax base is adjusted personal income, defined as the sum of:

1. Wages and salaries
2. Proprietors' income (with IVA and CCAdj)
3. Rental income of persons (with CCAdj)
4. Dividends
5. Personal interest income, consisting of
   a. Net interest,
   b. Interest paid by government to persons and business less interest received by government,
   c. Interest paid by consumers to business.

An equivalent definition of adjusted personal income is total personal income less other labor income less transfer payments to persons plus personal contributions for social insurance.

Wages and salaries, proprietors' income with IVA and CCAdj, rental income of persons with CCAdj, and net interest are estimated using the six income share equations. Supplementary equations are used for dividends, and for the difference between personal interest income and net interest. The equation for dividends uses the longrun elasticity of dividends with respect to corporate profits before tax, i.e., book profits, and the relative size of the book profits gap. The equation for the difference between personal interest income and net interest uses the GNP gap and a time trend.

For corporate profits taxes, the tax base is book profits. The income share equation for corporate profits provides estimates of corporate profits with IVA and CCAdj. Book profits excludes both the IVA and CCAdj. The IVA is closely related to changes in the price level. However, because the price level is assumed to be the same at high employment as at actual employment, the IVA has very little effect on the gap between actual and high-employment book profits. The CCAdj, however, is significantly related to the profits gap as well as to the price level. Therefore, the CCAdj is adjusted using an equation that estimates changes in the CCAdj share of GNP on the basis of changes in the lagged share, changes in the GNP gap, and a variable representing changes in the tax law.

For contributions for social insurance, the tax base is either wages and salaries (adjusted for program coverage) or proprietors' income, depending on the social insurance program. For indirect business taxes, the tax base is GNP.

Table 8.— Income Share Equations

Income component/GNP	Con-stant term	Time	GNP GAP$_t$	GNP GAP$_{t-1}$	GNP GAP$_{t-2}$	GNP GAP$_{t-3}$	GNP GAP$_{t-4}$	ΣGAP coefficients	$\bar{R}^2$	sE	Rho[1]
Wages and salaries	0.5310 (83.49)		0.2221 (8.49)	−0.1231 (−5.08)	−0.0890 (−3.67)	−0.0224 (−0.91)	−0.0501 (−2.18)	−0.0425	0.96	0.0021	0.96
Other labor income and employer contributions for social insurance	.0128 (2.31)	0.00085 (11.58)	.0184 (1.87)	−.0169 (−1.62)	−.0064 (−0.61)	−.0122 (−1.34)		−.0180	.40	.0009	.98
Corporate profits with IVA and CCAdj	.1211 (17.57)	−.00057 (−4.74)	−.3028 (−15.28)	.0409 (1.49)	.0690 (2.34)	.0431 (0.87)	.0899 (2.64)	−.1348	.83	.0023	.94
Proprietors' income with IVA and CCAdj	.1287 (89.74)	−.00068 (−15.89)							.89	.0017	.87
Rental income of persons with CCAdj and net interest	.0924 (24.06)	.00026 (17.05)	.0507 (5.02)	.0182 (1.67)	.0023 (0.19)	.0015 (0.13)	−.0194 (−1.97)	.0532	.32	.0009	.62
GNP less national income [2]	.1790	.00004	.1914	.0828	.0334	.0161	−.8204	.2123			

1. From initial nonlinear least-squares regression.
2. Coefficients derived from the constraint that the sum across equations of the coefficients on the constant term equals 1, and the sum of coefficients for each variable in all six equations equals zero.

NOTE.—Convergence obtained in five iterations. Convergence criterion: All changes in coefficient values between iterations were required to be less than 0.0000001.

Variable definitions (see text for estimation technique): GNPGAP=(GNPK73−GNP72)/GNPK72, where GNPK73 is real potential GNP and GNP72 is real GNP. Time=1 in 1948:1 increasing by 1 thereafter.
Estimation period: 1955:1 to 1979:4.
Numbers in parentheses are t-statistics.

Personal tax and nontax receipts

Personal tax and nontax receipts in the NIPA's are measured on a "when paid" basis and cover not only the individual income tax, but also estate and gift taxes and certain fines and fees. The income tax was more than 97 percent of the total in 1978. The methodology described is for the income tax; the results are applied to the total.

The individual income tax is the largest source of Federal receipts. Its share in total receipts has been stable; for both 1955–58 and 1976–79, it was 45 percent. The progressivity of the tax has driven the share up, but periodic tax cuts have brought it back down.

Estimates of the overall elasticity of the individual income tax with respect to income vary widely. To an important extent, this variation is due to the fact that different elasticities are appropriate for different sources of change in income. The estimates of the overall tax elasticity used here, which average 1.4, are thought to be appropriate for translating cyclical fluctuations in income into receipts gross-ups, but are probably not appropriate for longrun projections or for studies of the impact of inflation on receipts.

To understand why tax elasticity estimates vary and why different estimates are appropriate for different uses, it is helpful to distinguish between two sources of change in the aggregate income reported on tax returns: changes in the number of returns and changes in income per return. An increase in the number of returns, if the additional returns have incomes similar to existing returns, should raise reported incomes and income taxes by the same proportion, which is equivalent to a tax elasticity of 1.0. An increase in income per return, whether due to price change or to real income change, is generally taxed at a marginal rate higher than the taxpayer's average rate, which is equivalent to a tax elasticity larger than 1.0. For example, a four-person family with an adjusted gross income (AGI) of $20,000 in 1979, taking the standard deduction, would face a marginal tax rate on additional income of 24 percent and an average tax rate of 11.3 percent, or a tax elasticity—the ratio of the marginal rate to the average rate—of 2.1.

Trends in incomes over the last 30

years have consisted of a relatively large component of increases in income per tax return, and only a relatively small component of increases in the number of tax returns. Cyclical fluctuations, in contrast, have been split much more evenly between these two components. Consequently, trend projections of tax receipts should be based on higher tax elasticities than tax receipts gross-ups, which are due to cyclical fluctuations in income.

Typically, estimates of the overall tax elasticity based on time series refer to some average of trend movements and cyclical fluctuations.[18] They are, therefore, higher than the estimates used in the high-employment budget calculations.

Estimates of the overall tax elasticity based on cross-section studies employ some average of changes in income per return and changes in the number of returns.[19] Most of them give a smaller weight to changes in the number of returns than is appropriate for analyzing the impact of cyclical fluctuations in income.[20] Consequently, they too, tend to be higher than the estimates used here.

$$(10) \qquad E_{T \cdot APl} = \frac{[\hat{n}_s + (\hat{y}_s - \hat{n}_s \hat{y}_s)\, e_{t \cdot ps}]\, t_s + [\hat{n}_j + (\hat{y}_j - \hat{n}_j \hat{y}_j)\, e_{t \cdot pj}]\,(1 - t_s)}{[\hat{n}_s + \hat{y}_s - \hat{n}_s \hat{y}_s]\, a_s + [\hat{n}_j + \hat{y}_j - \hat{n}_j \hat{y}_j]\,(1 - a_s)}$$

where:

$E_{T \cdot APl}$ = elasticity of individual income tax with respect to adjusted personal income;

$\hat{n}_s$ = percent gap, number of single returns;

$\hat{n}_j$ = percent gap, number of nonsingle returns;

y_s = percent gap, income per single return;

y_j = percent gap, income per nonsingle return;

$e_{t \cdot ps}$ = tax elasticity for income per return, single returns;

$e_{t \cdot pj}$ = tax elasticity for income per return, nonsingle returns;

t_s = tax liabilities from single returns as a fraction of total individual income tax liabilities;

a_s = adjusted gross income for single returns as a fraction of total adjusted gross income.

Basic approach.—As the first step, a gap in adjusted personal income is factored into a gap in the number of returns and a gap in income per return.[21] Each of these is further separated into a gap for single returns and a gap for nonsingle returns. There are thus four components of a gap in adjusted personal income. Tax elasticities of 1.0 are applicable to number-of-returns gaps because these components are defined as changes in number of returns holding constant both income per return and the distribution of income among returns. Tax elasticities that are estimated annually from published Internal Revenue Service (IRS) statistics are applied to income-per-returns gaps.[22]

The overall elasticity of the individual income tax with respect to income depends on the four components of the gap and their tax elasticities. The rather complex formula is essentially a weighted sum of the component gaps multiplied by their elasticities, all divided by a weighted sum of the component gaps. The exact formula follows, with the subscript, referring to single returns, and the subscript, to nonsingle (largely joint) returns:[23]

The elements of this formula obviously do not fully represent the complexities of the individual income tax. They do, however, incorporate

18. Time-series estimates appear on pp. 390–91 of Joseph A. Pechman, "Responsiveness of the Federal Individual Income Tax to Changes in Income," *Brookings Papers on Economic Activity*, no. 2 (1973), pp. 385–421. See also, William H. Waldorf, "The Responsiveness of Federal Personal Income Taxes to Income Change," SURVEY, December 1967, pp. 32–45; and Victor Yu, "Fluctuations of the Income Elasticity of the Income Tax", Congressional Budget Office technical staff paper (1980).

19. Pechman, "Responsiveness of the Federal Individual Income Tax," pp. 394–402, contains cross-section estimates designed to be appropriate for longrun projections. David Greytak and Richard McHugh, "Inflation and the Individual Income Tax," *Southern Economic Journal*, vol. 45 (July 1978), pp. 168–80, contains cross-section estimates based solely on increases in income per return, appropriate for analyzing the impact of inflation on tax receipts.

20. The Pechman study includes estimates (for three different tax laws) of an aggregate tax elasticity that is cyclical ("Responsiveness of the Federal Individual Income Tax," p. 404, estimates labeled "vertical elasticity"), but the estimates assume no cyclical deviations from trend in number of returns. Consequently, the Pechman estimates are higher than most of the annual estimates presented here.

21. The income share equations permit the calculation of adjusted personal income at both actual and high-employment levels. Adjusted personal income resembles *AGI*, the income measure used in individual income tax law, but differs from it in two major ways: (1) *AGI* understates many types of nonwage income because of underreporting, and (2) *AGI* includes some capital gains, which are excluded from personal income.

22. IRS statistics measure income tax liabilities, while the NIPA's measure income tax payments. The elasticities used to estimate tax payments gross-ups are thus based on the relationship of tax liabilities to income.

23. If there were only one type of tax return, then the income gap would be $(\hat{n} + \hat{y} - \hat{n}\hat{y})$, the sum of gaps in the number of returns $(\hat{n})$ and in income per return $(\hat{y})$ minus their interaction. The tax gap corresponding to this income gap is obtained by multiplying $\hat{y}$ by its elasticity, $e_{t \cdot p}$, and $\hat{n}$ by its elasticity, 1.0, to obtain $(\hat{n} + (\hat{y} - \hat{n}\hat{y})e_{t \cdot p})$. The elasticity is the ratio of the second expression to the first. Equation (10) is an extension of this simple case to two types of tax returns,

important factors. The distinction between single and nonsingle returns captures major differences in tax schedules, and the distinction between number of returns and income per return captures a major influence on the overall tax elasticity.

The paragraphs that follow describe how each of the elements of this formula is measured: (1) the number-of-returns gaps, (2) the income-per-return gaps, (3) the shares of income and taxes, and (4) tax elasticities. The description concludes with a summary of the overall tax elasticity from 1955 to 1979.

Number-of-returns gaps.—The first step in calculating the number-of-returns gaps is to estimate the relationship of the overall employment gap to the GNP gap. This relationship indicates that, on the average, each 1-percentage point change in the GNP gap produces a 0.62 percentage point change in the employment gap. The equation is:

$$(11) \quad EGAP = -0.001 + 0.62 \ (GNPGAP)$$
$$(-0.9) \quad\quad (12.4)$$

$$R^2 = 0.88; \quad\quad D-W = 1.6;$$

Period of fit = 1955–77;
(*t*-statistics in parentheses).

where *EGAP* is the employment gap.

To go from employment to the number of single returns and number of

CHART 10

Changes From Preceding Year in Employment and in Single Returns, 1953-77

Single Returns
In Millions

Employment In Millions

Data: Internal Revenue Service, Statistics of Income, and Bureau of the Census, Current Population Surveys.

U.S. Department of Commerce, Bureau of Economic Analysis

nonsingle returns, two relationships are estimated between annual changes in single and nonsingle returns, respectively, and the change in employment. Chart 10 depicts the relation between changes in employment and changes in the number of single returns. Regression results indicate that the number of single returns changes by 81 for a change of 100 in the number employed; number of nonsingle returns changes by only 10 for a change of 100. The equations are:

$$(12) \quad \Delta S = -350.9 + 0.81 \ \Delta E - 5659 \ \Delta DS$$
$$(-9.3) \quad (8.9) \quad (-3.7)$$

$$(13) \quad \Delta J = 488.0 + 0.10 \ \Delta E - 1336 \ \Delta DJ$$
$$(3.4) \quad (1.2) \quad (-1.5)$$

For equation (12),

$$R^2 = 0.80; \quad\quad D-W = 1.4.$$

For equation (13),

$$R^2 = 0.07; \quad\quad D-W = 1.4.$$

Period of fit: 1953–77 (annual)
(*t*-statistics in parentheses).

where:

S	=	number of single returns;
J	=	number of nonsingle returns;
E	=	total civilian employment;
DS, DJ	=	minimum income for which tax returns are required, as a ratio to personal income per capita, for single and nonsingle returns, respectively.

Income-per-return gaps.—To estimate the income-per-return gaps for single and nonsingle returns, the first step is to specify an identity that translates the adjusted personal income gap and the overall employment gap into an income-per-person-employed gap. The identity is:

$$(14) \quad API/EGAP = \frac{APIGAP - EGAP}{1 - EGAP}$$

where *API/EGAP* is the income-per-person-employed gap, *APIGAP* is the adjusted personal income gap, and *EGAP* is the employment gap.[24]

24. To establish the identity, let $APIK$ equal high-employment adjusted personal income, API equal actual adjusted personal income, EK equal high-employment employment, and E equal actual employment. Then the right-hand side of the identity is:

$$\frac{\frac{APIK - API}{APIK} - \frac{EK - E}{EK}}{1 - \frac{EK - E}{EK}}$$

$$= \frac{\left(1 - \frac{API}{APIK}\right) - \left(1 - \frac{E}{EK}\right)}{1 - \left(1 - \frac{E}{EK}\right)} = \frac{\frac{E}{EK} - \frac{API}{APIK}}{\frac{E}{EK}}$$

Multiplying the numerator and the denominator of the last expression by $APIK/E$ gives high-employment income per person employed less actual income per person employed, divided by high-employment income per person employed—which is the income-per-person-employed gap.

The next step is to specify two equations relating annual changes in *AGI* per return for single and nonsingle returns, respectively, to the change in adjusted personal income per person employed. The equations indicate that a 1-percent change in adjusted personal income per person employed leads to a 1.18 percent change in *AGI* per single return and a 1.13 percent change in *AGI* per nonsingle return. These two coefficients are used to translate the income per person employed gap (*API/EGAP*) into income-per-return gaps for single and nonsingle returns.

The equations follow:

$$(15) \quad \Delta \log AGI/S = -0.012$$
$$(-0.8)$$

$$+ 1.18 \ \Delta \log API/E + 0.18 \ \Delta DS$$
$$(4.2) \quad\quad (3.4)$$

$$(16) \quad \Delta \log AGI/J = -0.002$$
$$(-0.1)$$

$$+ 1.13 \ \Delta \log API/E - 0.02 \ \Delta DJ$$
$$(5.0) \quad\quad (-0.9)$$

For equation (15),

$$R^2 = 0.56; \quad\quad D-W = 1.9$$

For equation (16),

$$R^2 = 0.53; \quad\quad D-W = 2.2$$

Period of fit = 1956–77 (annual).

where *AGI/S* is *AGI* per single return, *AGI/J* is *AGI* per nonsingle return, and *API/E* is adjusted personal income per person employed.

Shares of income and taxes.—The income and tax weights used in equation (10) were actual, rather than high-employment, shares of liabilities from single and nonsingle returns in total tax liabilities and of *AGI* on single and nonsingle returns in total *AGI*. This simplification seemed reasonable because, although the actual and high-employment shares differed, the differences were extremely small for income gaps no larger than those of the 1955–78 period.

The share of liabilities from single returns was the same in 1955 and 1978, 19 percent; in the intervening years, it gradually fell to a low of 15 percent in 1971 and then gradually rose. The share of *AGI* from single returns was lower in 1955 than in 1978, 18 compared with 21 percent. It reached a low of 16 percent in 1961–65, falling slowly until then and rising slowly afterwards.

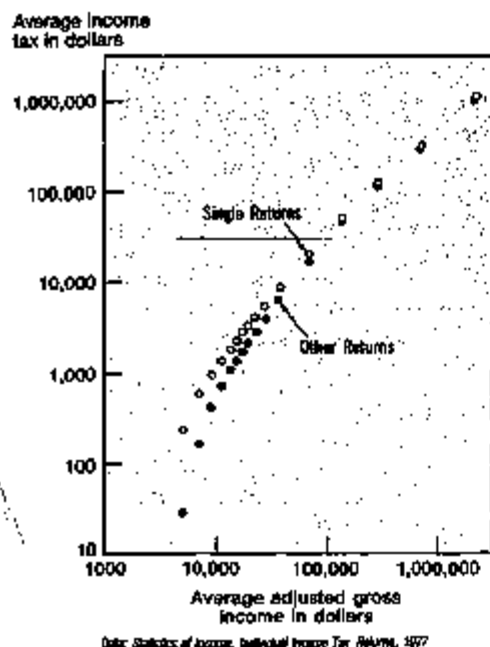*Tax elasticities.*—The two tax elastic-
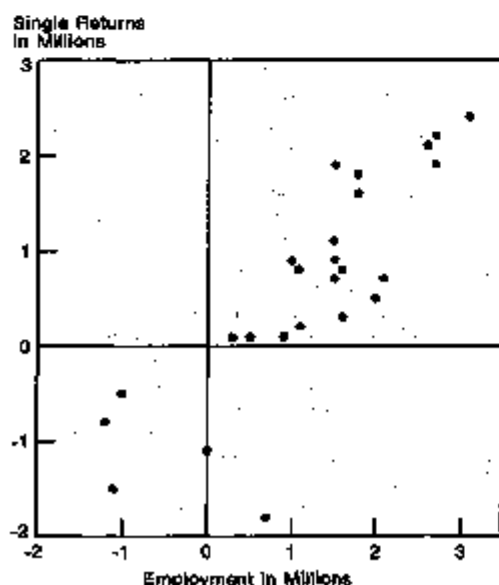
CHART 11

Adjusted Gross Income and Income Taxes, 1977

Average income tax in dollars

Data: Statistics of Income, Individual Income Tax Returns, 1977

U.S. Department of Commerce, Bureau of Economic Analysis

ities applicable to number-of-returns gaps are 1.0, because they measure the taxes that accompany additional returns when income per return and the distribution of income are held constant. If in fact the typical marginal return has a below-average income, then income per return will tend to fall when additional returns are added, but the income-per-return gaps will take account of this decline.

The two tax elasticities applicable to average income-per-return gaps are cross-section estimates prepared for each year using IRS, *Statistics of Income, Individual Income Tax Returns*, which shows tax liabilities by *AGI* intervals. Average income tax and average *AGI* by *AGI* intervals for 1977 are plotted in chart 11 on a double logarithmic scale. One method of obtaining elasticities is to estimate the slopes of the two curves in the chart, weighting each point by its share of total tax liabilities.

In this study, elasticities are obtained by dividing a weighted average of marginal tax rates by a weighted average of average tax rates. The weights are proportional to *AGI* in each interval. The two methods yield the same results for infinitely small changes in income.

For finite changes, the method used in this study yields slightly higher elasticities.[25]

Elasticities for income-per-return gaps range from 1.38 for single returns in 1963 to 1.73 for nonsingle returns in 1977 (table 9). The elasticities are somewhat higher in recent years; the higher level may be due to the increase in standard deductions.

Overall results.—As the final step, the overall tax elasticity derived from equation (10) is smoothed. A 5-year moving average of absolute values of the numerator is divided by a 5-year moving average of absolute values of the denominator to obtain the final elasticity for each year. The principal reason for the smoothing is that in years when the GNP gap is close to zero, even very small changes in either the numerator or the denominator can cause enormous changes in the un-smoothed series. (The tax elasticities in these years, however, have little effect on high-employment budget totals, because they are applied to very small income gaps.) The tax elasticity for the individual income tax ranges from 1.30 to 1.47, as table 10 shows. The table also shows the unsmoothed tax elasticity.

To test the sensitivity of the high-employment budget estimates to the tax elasticity estimates, the tax elasticity

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25. See U.S. Treasury Department, Office of Tax Analysis, "Estimated Changes in Personal Income Tax Elasticity: A Study Outline," technical staff paper (March 1979).

Table 9.—Elasticities of the Individual Income Tax with Respect to Adjusted Gross Income Per Return

Year	Single returns	Nonsingle returns
1955	1.52	1.59
1956	1.48	1.55
1957	1.48	1.57
1958	1.55	1.57
1959	1.47	1.54
1960	1.45	1.55
1961	1.45	1.62
1962	1.45	1.61
1963	1.38	1.54
1964	1.52	1.57
1965	1.52	1.57
1966	1.51	1.62
1967	1.50	1.61
1968	1.49	1.56
1969	1.53	1.56
1970	1.54	1.56
1971	1.55	1.59
1972	1.61	1.61
1973	1.59	1.60
1974	1.57	1.59
1975	1.63	1.67
1976	1.64	1.69
1977	1.71	1.73
1978	1.69	1.70

Table 10.—Elasticities of Individual Income Tax with Respect to Adjusted Personal Income

Year	Un-smoothed	Final
1955	2.14	1.47
1956	1.82	1.42
1957	1.57	1.42
1958	1.60	1.39
1959	1.42	1.39
1960	1.38	1.40
1961	1.46	1.41
1962	1.42	1.43
1963	1.45	1.44
1964	1.50	1.44
1965	1.75	1.44
1966	1.32	1.40
1967	1.24	1.38
1968	1.26	1.30
1969	1.35	1.32
1970	1.26	1.35
1971	1.36	1.34
1972	1.83	1.31
1973	.62	1.35
1974	1.32	1.37
1975	1.37	1.38
1976	1.43	1.40
1977	1.46	1.42
1978	1.46	1.44
1979	1.40	1.43

1. This estimate is based on the assumption that the income-per-return tax elasticities with respect to AGI and the single and nonsingle returns shares of AGI and taxes are the same in 1979 as in 1978.

and the associated receipts gross-up were recalculated using tax elasticities for income-per-return 0.1 higher than those shown in table 9. The maximum difference in the two estimates of high-employment receipts, which was reached in the first quarter of 1975 when the GNP gap was at its maximum, was about $800 million, or one-quarter of 1 percent of high-employment receipts.

Corporate profits tax accruals

Corporate profits taxes, which are recorded in the NIPA's on an accrual basis, have declined from 29.0 percent of Federal receipts in 1955 to 15.7 percent in 1979. Two major factors have contributed to this decline: Corporate profits have declined as a share of GNP, and the average tax rate on corporate profits has fallen about 10.5 percentage points. The fall in the average tax rate reflects reductions in statutory tax rates and the enactment of tax credits, particularly the investment credit.

Corporate profits tax accruals are highly sensitive to the business cycle, because, as shown in table 8, corporate profits generally rise and fall more than in proportion to changes in real GNP. Less well understood is the sensitivity of the average tax rate to the business cycle. This subject is the major focus of the following discussion.

Table 11.—Corporate Profits Tax Rate Schedule
[Percent]

Period	First $25,000	Second $25,000	Third $25,000	Fourth $25,000	Above $100,000
1955–63	30	52	52	52	52
1964	22	50	50	50	50
1965–74	22	48	48	48	48
1975–78	20	22	48	48	48
1979	17	20	30	40	46

NOTE.—A surcharge of 10 percent was applied to tax liabilities in 1968 and 1969, and of 2.5 percent in 1970.

Source: Department of Treasury, Internal Revenue Service.

Corporate profits before tax in the NIPA's include the earnings of the Federal Reserve System that are deposited in the Treasury and rest-of-the-world profits, which are measured as net receipts of dividends and branch profits from abroad. It is assumed that both the earnings of the Federal Reserve and rest-of-the-world profits are invariant to the cycle. Accordingly, the analysis of the cyclical sensitivity of the average corporate tax rate that follows uses modified measures of corporate profits and profits taxes from which these two components have been removed.

Several factors could cause the average tax rate on modified profits to be cyclically sensitive. One factor is that the tax rate structure is slightly progressive, as shown in table 11. The other factors, which are discussed next, vary disproportionately with profits over the cycle and therefore cause the average Federal tax rate to change cyclically.

(1) State corporate income taxes, which can be deducted in arriving at taxable profits, are less cyclically sensitive than corporate profits, mainly because States raise their tax rates during recessions and lower them during recoveries.[26]

(2) Tax-exempt interest income is a component of profits that is less cyclically sensitive than corporate profits. This factor has become increasingly important because tax-exempt interest income has risen from 1.0 percent of corporate profits in 1955 to 5.2 percent in 1977.

(3) Realized capital gains, which are taxed but which are not included in corporate profits before tax, are more cyclically sensitive than profits. Corporate capital gains decrease relative to corporate profits during a cyclical downturn and increase relative to profits during a recovery.[27]

(4) Only profits of corporations earning profits are taxed, while losses of loss corporations are deducted from profits of corporations earning profits in arriving at corporate profits before tax. Corporate losses can significantly affect the average tax rate on modified profits over the cycle because corporate losses increase during a recession and fall during a recovery. The effect of losses is complicated by the fact that they can be deducted from profits up to 3 years prior to, or 5 years following, the year in which the loss occurs. It is estimated that roughly 20 percent of the losses are carried back and 30 percent are carried forward.

(5) Tax credits may be cyclically sensitive to a different extent than profits. The foreign tax credit is associated with profits earned by U.S. corporations operating abroad, which are assumed to be insensitive to the cycle. The sensitivity of the other major credit, the investment credit, is discussed in connection with equation (17). This credit was enacted in 1962, and was set at a maximum of 7 percent of expenditures on depreciable machinery and equipment. The maximum rate applied to assets with a useful life of 7 years or more. For assets with useful lives of 3 to 5 and of 5 to 7 years, the credit was one-third and two-thirds, respectively, of the maximum rate. The credit was applicable at 7 percent from January 1, 1962, to October 9, 1966; repealed; reenacted, applicable from March 9, 1967, to April 17, 1969; repealed; and reenacted again, applicable from April 2, 1971, to December 31, 1974. On January 1, 1975, the rate was raised to 10 percent; the one-third and two-thirds scaledown was continued. Investment credits used by corporations in 1977 were $9.0 billion, 5.6 percent of modified corporate profits.

Results.—The framework within which the corporate profits tax elasticity is estimated is based on the following equation.

(17) $$CPT = r(IST) - C$$

where:

CPT = corporate profits tax liability;
r = the average tax rate, before credits, on income subject to tax;
IST = corporate income subject to tax;
C = tax credits.

Corporate income subject to tax, IST, is approximated by adding losses (expressed as a positive value) and capital gains to modified profits, and subtracting State corporate profits taxes, tax-exempt interest, and deductions for loss carryovers.

From equation (17), the marginal corporate tax rate on modified profits and the elasticity of taxes to modified profits can be derived as follows:

(18)
$$\frac{\partial CPT}{\partial CP} = r\left(\frac{\partial IST}{\partial CP}\right) + IST\left(\frac{\partial r}{\partial CP}\right) - \frac{\partial C}{\partial CP}$$

where CP = modified corporate profits.

(19) $E_{CPT \cdot CP}$
$$= \frac{r(IST)[(1+E_{r \cdot IST})E_{IST \cdot CP}] - C(E_{C \cdot CP})}{r(IST) - C}$$

Thus, the elasticity of corporate profits taxes with respect to modified profits depends on three other elasticities: (1) the average tax rate with respect to income subject to tax, (2) income subject to tax with respect to modified profits, and (3) tax credits with respect to modified profits. Each of these elasticities is discussed below.

The effect of the progressivity of the rate structure on the corporate profits tax elasticity was estimated by first calculating five series of hypothetical tax liabilities (before credits) for the last 25 years, each series based on one of the five schedules that were in effect

26. See Robert C. Vogel, "The Responsiveness of State and Local Receipts to Changes in Economic Activity: Extending the Concept of the Full Employment Budget," U.S. Congress, Joint Economic Committee, *Studies in Price Stability and Economic Growth*, paper no. 7 (June 1975). Research for this article found similar results.

27. Capital gains in the lumber and paper industry are considered ordinary income in the NIPA's, and accordingly are included in corporate profits before taxes. Capital gains as defined in this article therefore exclude these capital gains.

during this period. The series were constructed by applying each of the schedules to *Statistics of Income, Corporation Income Tax Returns* data showing the total amount of profits earned in each of the income classes. For each of the five series, estimated tax liabilities were regressed against income subject to tax, as shown in table 12.

Equation A in table 12 was used to estimate the effect of the progressive rate structure on the corporate profits tax elasticity from 1955 to 1963. The coefficient on the independent variable represents the marginal tax rate on income subject to tax. This coefficient (0.519) was divided by the average tax rate for each of the years 1955 to 1963 to estimate the elasticity of tax liabilities (before credits) to income subject to tax in each of these years. The coefficients of equations B through E were used in a similar manner to estimate elasticities in subsequent years.

The elasticity of the average tax rate with respect to income subject to tax, which is the elasticity calculated above less 1, was 0.08 in 1955. Subsequently, it declined steadily as rising average corporate profits diminished the relative importance of the first tax bracket. This downward trend was interrupted in 1975 and again in 1979 when the tax law changes made the corporate profits tax more progressive. Nevertheless, the elasticity was estimated to have fallen to 0.02 by 1979.

The elasticity of income subject to tax with respect to modified profits is derived from the following basic equation:

$$(20) \quad IST = CP - \sum_{i=1}^{n} ADJ_i$$

where ADJ_i represents the ith adjustment to modified profits made, as mentioned earlier, to approximate income subject to tax. Based on equation (20), the elasticity of income subject to tax with respect to corporate profits can be shown to be:

$$(21) \quad E_{IST \cdot CP} = \frac{CP - \sum_{i=1}^{n} ADJ_i(E_{ADJ_i \cdot CP})}{CP - \sum_{i=1}^{n} ADJ_i}$$

Thus, the degree to which $E_{IST \cdot CP}$ differs from 1.0 depends on the degree to which the weighted average of $E_{ADJ_i \cdot CP}$ differs from 1.0.

The elasticity of each of these adjustments with respect to modified profits is calculated in two steps. First, the cyclical sensitivity of each of the adjustments and of modified profits is estimated in a manner analogous to the income share equations discussed earlier, i.e., by using the GNP

gap as an independent variable.[29] The resulting coefficients and elasticities derived from them are shown in table 13.

The elasticities of the adjustments with respect to GNP were divided by the elasticity of modified profits with respect to GNP to produce estimates, also shown in table 13, of the elasticities of each adjustment with respect to modified profits.

When these results are incorporated into equation (21), the elasticity of income subject to tax with respect to modified profits ranges from 0.76 to 0.79 with a mean of 0.78. The effect of corporate losses is clearly dominant, because it is the only adjustment that causes the elasticity to be less than 1.0.

The analysis of the cyclical sensitivity of the investment credit is complicated by two major factors. First, the numerous legislative changes severely limit the use of direct time series analysis. An alternative approach was tried on the assumption that the cyclical sensitivity of investment in producers' durable equipment would be a good proxy for the cyclical sensitivity of the investment credit. This approach, however, was deficient in several ways. As noted earlier, the percentage amount of the credit varies, depending on the useful

Table 13.—Cyclical Sensitivity Estimates of Selected Adjustments to Corporate Profits with Respect to Modified Corporate Profits

	Constant term	Coefficients		$E_{ADJ_i \cdot GNP}$ at mean	$E_{ADJ_i \cdot CP}$ at mean	$\bar{R}^2$	D-W	SE	Rho
		%GNP Gap [1]	Potential GNP						
Adjustments:									
State corporate profits taxes	−0.254 (−4.4)	−0.011 (−6.6)	0.008 (14.7)	1.5	0.5	0.91	2.04	0.20	0.93
Tax-exempt interest	−1.690 (−13.2)	−.002 (−1.2)	.006 (25.5)	.9	.3	1.00	1.99	.14	.52
Capital gains	.778 (1.2)	−.020 (−2.8)	.008 (7.2)	4.2	1.4	.84	1.78	.95	.32
Losses	−1.379 (−.8)	.042 (2.5)	.023 (7.6)	−3.9	−1.3	.96	1.51	1.66	.84
Less carryovers	−.533 (−2.3)	−.006 (−2.0)	.004 (13.9)	1.9	.6	.96	1.58	.80	.52
Modified profits	3.515 (.4)	−.291 (−6.4)	.088 (10.5)	3.1	n.a.	.96	1.56	4.99	.83

n.a. Not applicable.
1. %GNP gap = Potential GNP less actual GNP, in current dollars.
NOTE.—Numbers in parentheses are t-statistics.

Table 12.—Constant-Law Corporate Profits Tax Liabilities (Before Credits) as a Function of Income Subject to Tax

Equation	Tax law [1]	Constant term	Coefficient: income subject to tax	$\bar{R}^2$	D-W	SE	Rho
A	1955 to 1963	−0.675 (−3.9)	0.519 (600.2)	1.00	1.68	0.05	0.90
B	1964	−.824 (−4.9)	.497 (303.5)	1.00	1.82	.12	.70
C	1965 to 1974 [1]	−.796 (−5.9)	.478 (455.7)	1.00	1.60	.06	.90
D	1975 to 1978	−1.299 (−5.0)	.474 (252.1)	1.00	2.39	.10	.91
E	1979	−1.426 (−5.0)	.452 (212.7)	1.00	2.23	.12	.90

1. Profits taxes exclude the tax surcharge in effect during 1969-70. The surcharge increased the marginal tax rate but did not affect the elasticity.
NOTE.—Numbers in parentheses are t-statistics.

life of the investment. Thus, changes in the composition of investment can cause credits to change at a different rate. Also, producers' durable equipment does not cover all investment eligible for the credit.

Second, there are limits on the percentage of a corporation's tax liability that can be offset by the investment credit. In 1978, the limit was generally 100 percent of the first $25,000 of tax liability and 50 percent of tax liability above $25,000.[29] Under current law, these credits can be carried back 3 years or forward 7 years. The existence of unused credits may make credits more cyclically responsive than investment because, if profits increase faster than investment during a recovery, the limit on the percentage of a corporation's tax liability that can be offset by the investment credit would be less restrictive. Because the magnitude of unused investment credits is relatively large—credits carried over from 1976 were $5.3 billion—this factor could be quite significant.

The analysis of the cyclical sensitivity of investment in producers' durable equipment shows that it is less cyclically sensitive than profits. Based on the approach adopted for table 13, the elasticity of investment with respect to modified profits is estimated to be 0.7. However, a review of credits claimed by corporations for the limited number of years when there were no major legislative changes suggests raising that estimate. It was therefore assumed that the elasticity of credits with respect to profits is 1.0. The overall elasticity of taxes with respect to modified profits is not sensitive to this assumption. If the elasticity were assumed to be 0.7 instead of 1.0, the overall elasticity would be raised only 0.01.

Combining these results for $E_{r,IBT}$, $E_{IBT\cdot CP}$, and $E_{C\cdot CP}$ in equation (19) produces overall elasticity estimates that range from 0.79 to 0.83, with a mean value of 0.80, for the period from 1955 to 1977. Because of the narrowness

29. The percentage applicable to tax liability in excess of $25,000 was increased to 60 percent in 1979 and 70 percent in 1980; it will increase an additional 10 percentage points in both 1981 and 1982, reaching its permanent level of 90 percent in 1982.

of this range, the mean value was used for all years.

Indirect business tax and nontax accruals

Indirect business taxes in the NIPA's are recorded on an accrual basis and consist of excise taxes, customs duties, and a relatively small amount of nontax accruals. Indirect business taxes declined steadily as a share of total receipts until 1980, when the windfall profits tax was enacted. In 1955, indirect business taxes accounted for 14.7 percent of Federal receipts, compared with 6.0 percent in 1979.

The decline in the share of indirect business taxes is largely due to two factors. First, a number of excise taxes were repealed or reduced. Under the Excise Tax Reduction Act of 1965, many manufacturers' and retailers' excises were repealed. The auto excise tax was eliminated in 1971, and a phaseout of the 10-percent tax on telephone services began in 1973. Second, about one-half of indirect business taxes are specific (a fixed amount per unit) and therefore do not respond directly to price level changes. With the exception of the gasoline tax, which was increased from 1.5 cents to 4 cents per gallon in 1959, the major specific excise tax rates—such as for alcohol and tobacco—have not been changed since 1955. Partly offsetting the decline in the share of excise taxes, the share of customs duties increased, as imports increased.

The elasticity of indirect business taxes was estimated with respect to GNP. Demand elasticities with respect

Table 14.—Demand Elasticities with Respect to Income and Commodity Composition of Indirect Business Taxes

	Elasticities	Composition Percentages of total		
		1959	1969	1979
Alcoholic beverages	.5	24.4	24.1	20.3
Tobacco products	.25	14.9	11.0	8.7
Gasoline and oil	.5	15.5	17.9	15.0
Other specific excises	.7	3.6	5.8	6.7
Telephone services	.5	5.7	7.3	4.1
Autos and trucks	3.0	12.8	13.2	3.3
Retailer and other manufacturing excises	1.25	7.0	.3	.4
All other excises	.5	5.4	2.2	5.0
Customs duties	1.5	8.4	12.5	24.0
Nontax accruals	.25	2.2	5.7	10.8

Table 15.—Elasticity of Indirect Business Taxes with Respect to GNP

Year	Elasticity
1955	0.93
1956	.94
1957	.90
1958	.91
1959	.92
1960	.92
1961	.91
1962	.93
1963	.96
1964	.98
1965	.95
1966	.91
1967	.89
1968	.91
1969	.98
1970	.89
1971	.84
1972	.72
1973	.69
1974	.72
1975	.78
1976	.73
1977	.76
1978	.69
1979	.80

to income for ten categories of taxed commodities were weighted by the composition of indirect business taxes. The demand elasticities, which were derived from other studies, and the composition of the taxes for selected years are shown in table 14.

The equation for the elasticity of indirect business taxes with respect to GNP follows:

$$(22) \qquad E_{IBT\cdot GNP} = \sum_{i=1}^{n} a_i (E_{Q\cdot Y_i})$$

where:

$E_{IBT\cdot GNP}$ = the elasticity of indirect business taxes with respect to GNP;

a_i = indirect business tax i as a share of total indirect business taxes;

$E_{Q\cdot Y_i}$ = the demand elasticity with respect to income for taxed commodity i.

The changes in the composition of indirect business taxes have significantly altered their elasticity. Their elasticity with respect to GNP declined from a peak of 0.98 in 1964 to a low of 0.69 in 1978 (table 15). The sharpest decline occurred in 1971–72, when the automobile excise tax was removed. The decline due to elimination of cyclically sensitive excise taxes was partly offset by an increase in the share of customs duties, which are also highly sensitive to the cycle. Since 1973, the increase in the share of customs duties has raised the elasticity to 0.80 in 1979.

Table 16.—Composition of Contributions for Social Insurance

[Percentages of total]

Year	Social security and railroad retirement		Unemployment insurance	Federal civilian employee retirement	Other [1]
	Social security	Railroad retirement			
1955	63.4	8.6	14.7	7.0	6.3
1960	67.9	5.4	15.6	9.3	1.5
1965	70.7	2.6	15.2	8.9	2.6
1970	73.3	1.9	7.1	8.0	3.7
1975	80.7	1.6	7.2	7.4	3.2
1979	79.2	1.5	10.2	6.5	2.6

1. Consists of premium payments for supplementary medical insurance and veterans life insurance, and contributions for workmen's compensation.

Contributions for social insurance

Contributions for social insurance consist of contributions for social security and railroad retirement; unemployment insurance taxes; contributions for Federal civilian employees retirement; and an "other" category, which consists of supplementary medical insurance premiums, veterans life insurance premiums, and workmen's compensation. These contributions increased from 12.9 percent of total receipts in 1955 to 32.0 percent in 1979. The increase was due to expanded coverage of existing social insurance programs, enactment of new ones, and increases in tax rates and the taxable wage base.

As shown in table 16, the composition of contributions has changed significantly. Social security contributions were 63.4 percent of contributions in 1955 and 79.2 percent by 1979. Over the same period, the shares of most of the other major components of contributions declined.

Estimates of high-employment contributions are based on the cyclical responsiveness of the tax base for each major component of contributions and on the tax elasticity of each of these components. It is assumed that contributions for Federal civilian employees retirement and for the "other" category are not cyclically sensitive. The analysis for the other major components—for social security and railroad retirement, and for unemployment insurance—is described below.

Social security and railroad retirement contributions.—Over the last 25 years, the percentage of wages and salaries covered by social security increased gradually from 81.1 percent in 1955 to

90.4 percent in 1979; the combined tax rate on employers and employees increased from 4.0 to 12.26 percent; and the taxable wage base increased from $4,200 to $22,000. The increase in the taxable wage base was much larger than the increase in the average covered wage, a factor that has increased the cyclical sensitivity of social security contributions.

Estimates of the elasticity of social security contributions to changes in wages and salaries are based on separate elasticity estimates for average wage per employee and for employment. These elasticities are weighted by the gaps between actual and high-employment levels of wages and salaries and of employment.

The tax elasticity with respect to the average wage is defined as the percent change in social security contributions that accompanies a 1-percent change in wages and salaries attributable to changes in the average wage. This elasticity increased significantly in the 1970's because of the increase in the taxable wage base relative to average wages. The elasticity estimates, which are shown in table 17, are based on simulations using the Social Security Administration revenue estimating model.[20] They assume an equal percentage increase in all wages. From 1955 to 1973, the tax elasticity with respect to the average wage averaged 0.58 and ranged from 0.49 to 0.65. Since 1974, however, it has exceeded 0.70, and in 1979 it increased from 0.71 to 0.80, due to an unusually large increase in the taxable wage base.

The tax elasticity with respect to employment, defined as the percent change in social security contributions that accompanies a 1-percent change in wages and salaries attributable to changes in employment, is assumed to

20. Time series analyses provided tax elasticities with respect to the average wage that were very close to those resulting from the simulation analysis.

Table 17.—Social Security Contributions and Unemployment Insurance Taxes: Ratio of Taxable Earnings Base to Average Covered Wage and Tax Elasticity with Respect to the Average Wage

Year	Social security contributions		Unemployment insurance taxes	
	Ratio of taxable earnings base to average covered wage	Tax elasticity	Ratio of taxable earnings base to average covered wage	Tax elasticity
1955	1.46	0.51	1.04	0.45
1956	1.37	.50	.98	.42
1957	1.32	.57	.94	.39
1958	1.29	.54	.93	.39
1959	1.41	.50	.86	.38
1960	1.36	.57	.85	.37
1961	1.34	.56	.84	.35
1962	1.28	.54	.80	.35
1963	1.25	.52	.78	.35
1964	1.19	.50	.74	.33
1965	1.16	.49	.72	.33
1966	1.51	.63	.69	.33
1967	1.43	.60	.65	.32
1968	1.59	.65	.61	.30
1969	1.49	.62	.51	.30
1970	1.42	.59	.55	.29
1971	1.36	.57	.52	.29
1972	1.45	.60	.56	.34
1973	1.44	.65	.64	.32
1974	1.36	.72	.59	.31
1975	1.87	.71	.55	.31
1976	1.87	.71	.51	.30
1977	1.89	.72	.45	.29
1978	1.86	.71	.65	.35
1979 [r]	2.23	.80	.56	.34

r Preliminary.

be 1.0. If the distribution of wages of job gainers and losers is identical to that of the rest of the work force, then a change in employment will not bring about a change in the average wage. Alternatively, if the average wages of job gainers and losers are lower, as some have argued, then a change in employment will change the average wage, and this wage change will affect contributions through the tax elasticity with respect to the average wage.[31]

A small part of total social security contributions consists of those of the self-employed, and are related to proprietors' income rather than to wages and salaries. The elasticity of these contributions is assumed to be the same as the tax elasticity with respect to the average wage just described.

The elasticity of railroad retirement contributions is assumed to be the same as that of social security contributions (other than those of the self-employed). Because these contributions are a relatively small part of total receipts, errors introduced by this assumption are likely to be small.

The elasticity estimates for social security (including railroad retirement) contributions are derived using the following equation:

$$(23) \quad E_{ss \cdot cws} = (p^e \times 1.0) + (p^{\bar{w}} \times E_{ss \cdot \bar{w}})$$

where:

$E_{ss \cdot cws}$ = the elasticity of social security (including railroad retirement) contributions with respect to covered wages and salaries;

p^e = proportion of wage and salary gap attributable to changes in employment;

$p^{\bar{w}}$ = proportion of wage and salary gap attributable to changes in the average wage;

$E_{ss \cdot \bar{w}}$ = the elasticity of social security contributions with respect to average wage.

The weighted social security (including railroad retirement) contribution elas-

31. On the wage behavior of job gainers and losers, see Charles M. Beach, "Cyclical Sensitivity of Aggregate Income Inequality," *Review of Economics and Statistics*, vol. 59 (February 1977), pp. 56–66; Edward M. Gramlich, "The Distributional Effects of Higher Unemployment," *Brookings Papers on Economic Activity*, no. 2 (1974), pp. 293–341; and Thad W. Mirer, "The Distributional Impact of the 1970 Recession," *Review of Economics and Statistics*, vol. 55 (May 1973), pp. 214–24.

Table 18.—Elasticities of Social Security (including Railroad Retirement) Contributions and Unemployment Insurance Taxes with Respect to Covered Wages and Salaries

Year	Social security contributions	Unemployment insurance taxes
1955	0.84	0.75
1956	.83	.75
1957	.79	.71
1958	.80	.74
1959	.82	.72
1960	.80	.71
1961	.79	.69
1962	.76	.69
1963	.74	.65
1964	.68	.57
1965	.75	.67
1966	.82	.67
1967	.80	.81
1968	.85	.71
1969	.86	.74
1970	.78	.61
1971	.76	.63
1972	.82	.72
1973	.84	.69
1974	.87	.68
1975	.87	.66
1976	.87	.68
1977	.86	.65
1978	.85	.68
1979	.90	.66

ticity ranges from 0.68 in 1964 to 0.90 in 1979 (table 18).

In the gross-up of social security (including railroad retirement) contributions, it is assumed that the total dollar amount of the wage and salary gap falls into covered wages and salaries. Because only private wages and salaries are assumed to be cyclically sensitive, and because about 98 percent of all such wages and salaries are covered by social security, this is a reasonable approximation.

Unemployment insurance taxes.—Unemployment insurance taxes are levied on an employer's taxable payroll. The tax consists of a Federal and a State component, both of which are recorded as Federal receipts in the NIPA's.[32] The Federal tax rate, which was 0.3 percent from 1950 to 1970 and has ranged from 0.5 percent to its current level of 0.7 percent since then, is used to finance administrative costs and, in the 1970's, certain recession-related benefit payments. State tax rates vary from State to State and change over time; they have averaged about 1.75

32. This discussion focuses on unemployment insurance trust fund receipts. A very small portion of unemployment insurance receipts are recorded in the NIPA's for railroad employees and Federal employees. It is assumed that they have the same responsiveness to changes in earnings as unemployment trust fund taxes.

percent over the last 25 years. The State component of unemployment insurance taxes is credited to individual State trust fund accounts maintained by the Federal Government. The funds are used to finance unemployment benefits in each of the States. When individual State trust fund balances become low, as in recession periods, State tax rates are increased.

The taxable wage base was, for most States, $3,000 from 1950 to 1971, $4,200 from 1972 to 1977, and $6,000 from 1978 to the present. In contrast to social security contributions, the increase in the base has been considerably less than the increase in the average wage. The ratio of the taxable wage base to the average wage dropped steadily from 1955 to 1971, as shown in table 17, before increasing in 1972 and 1978, when the base was increased. Even with these increases, however, the ratio was substantially less in 1979 than in 1955.

As can be seen from equation (24), the estimation of the elasticity of unemployment insurance taxes is similar to that of social security contributions.

$$(24) \quad E_{ui \cdot cws} = (p^e \times 1.0) + (p^{\bar{w}} \times E_{ui \cdot \bar{w}})$$

where:

$E_{ui \cdot cws}$ = the elasticity of unemployment insurance taxes with respect to covered wages and salaries;

$E_{ui \cdot \bar{w}}$ = the elasticity of unemployment insurance taxes with respect to average wage.

The tax elasticity with respect to the average wage, as shown in table 17, is substantially below the corresponding social security elasticity because the taxable earnings base is lower. In 1979, the elasticity with respect to the average wage was less than one-half that of social security contributions. As in the case of social security contributions, the tax elasticity with respect to employment is assumed to be 1.0 and the overall tax elasticity is a weighted average of the two component elasticities. The weighted unemployment insurance tax elasticity ranges from 0.57 in 1964 to 0.81 in 1967 (table 18).

In the gross-up of unemployment insurance taxes, as in the case of social security contributions, it is assumed

that the total dollar amount of the wage and salary gap falls into covered wages and salaries.

Expenditure adjustments

Earlier estimates of the high-employment budget, both by the CEA and others, have adjusted expenditures only for the cyclical sensitivity of unemployment benefits. The new estimates expand the expenditure adjustment to cover six additional expenditure categories. These adjustments are based largely on a review and synthesis of research done by others.[33]

Unemployment benefits.—Since nationwide unemployment benefits were first provided as part of the Social Security Act of 1935, their cyclical sensitivity has increased for three reasons. (1) Employment covered by unemployment insurance has been expanded substantially, from 61.4 percent of total employment in 1955 to 92.0 percent in 1978. (2) Weekly benefit payments have increased relative to earnings, from 37 percent of weekly earnings in the private nonfarm sector in 1955 to 41 percent in 1978. (3) The duration of benefits has increased considerably beyond the 15 to 16 weeks originally provided in 1935. Currently, all States provide at least 26 weeks of "regular" benefits. In addition, when State or national unemployment is unusually high, extended benefits of up to 13 additional weeks are automatically provided.[34]

The expenditure adjustment for regular benefits is based on an equation that relates these benefits divided by annualized average weekly benefits per beneficiary to high-employment unemployment and to the ratio of actual unemployment to high-employment unemployment. The equation, estimated in logarithmic form, is:

$$(25) \quad \log \frac{UIB}{AWB} = 13.33 + 0.614 \log UK$$
$$\underset{(59.6)}{} \quad \underset{(3.6)}{}$$

$$+ 1.442 \log \left(\frac{U}{UK}\right)_1 + 0.922 \log \left(\frac{U}{UK}\right)_2$$
$$\underset{(13.9)}{} \quad \underset{(3.6)}{}$$

$$\bar{R}^2 = 0.96; \qquad D-W=2.1; \qquad Rho = 0.86$$

Period of fit = 1955:1–1979:4
(*t*-statistics in parentheses).

where
$\frac{UIB}{AWB}$ = regular unemployment benefits divided by annualized average weekly benefits per beneficiary;

UK = high-employment unemployment;

$\left(\frac{U}{UK}\right)_1$ = ratio of actual unemployment (U) to UK when U exceeds UK, 0 otherwise;

$\left(\frac{U}{UK}\right)_2$ = ratio of U to UK when U is less than UK, 0 otherwise.

The high-employment level of regular benefits is the actual level of regular benefits plus the difference between the estimated high-employment and estimated actual levels of benefits. This relationship simplifies to:

$$(26) \quad UIBK = UIB \left[\left(\frac{UK}{U}\right)^\lambda\right]$$

where λ is a parameter reflecting the relative earnings and program coverage for the cyclically unemployed. It is 1.442 if U exceeds UK and 0.922 if U is less than UK. Values of λ suggest that when the economy is operating above high-employment (U is less than UK), unemployment is concentrated among low-earnings groups, and when the economy is operating at less than high-employment (U exceeds UK), unemployment includes also some high-earnings groups with a high coverage ratio.

The equation results suggest that a 1-percentage point increase in the unemployment rate would increase regular unemployment benefits $2.4 billion at 1979 program levels.

Extended benefits that occur automatically, under provisions of the law described earlier, are excluded from high-employment expenditure estimates on the assumption that they would be zero if the economy stayed on a high-employment path. Extended benefits that have resulted from temporary provisions of law, in response to cyclical developments in the economy, are included in the high-employment expenditures estimates.[35]

Social security retirement benefits.—The old-age and survivors insurance program (OASI), enacted in 1935, now covers more than 90 percent of the labor force. In 1979, retirement benefits were $89.2 billion, or 17.5 percent of total Federal spending. Because of their large size, even a small degree of cyclical sensitivity can have sizable effects on Federal spending.

Research by the Social Security Administration and the Congressional Budget Office has found OASI benefits to be cyclically sensitive. Higher unemployment affects two groups of beneficiaries. First, it encourages workers 62–64 who become unemployed to take early retirement. Early retirement may come with a lag, however, because some workers first seek other employment while drawing unemployment benefits. Because a high percentage of eligible individuals in the 62–64 age bracket are employed, a relatively large cyclical response occurs from this group.

Second, persons age 65–71 who are unable to collect benefits because of the earnings limitation become beneficiaries during a recession, as earnings decline because of shorter work schedules or cease altogether because of unemployment.[36]

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33. Research on individual programs has been done by the U.S. Department of Health, Education and Welfare, the U.S. Department of Agriculture, the Congressional Budget Office, the Urban Institute, and Mathematica. For a review and synthesis of this research, and also for a more detailed description of the expenditure adjustments presented in this article, see Darwin G. Johnson, "Sensitivity of Federal Expenditures to Unemployment," Office of Management and Budget technical staff paper (April 1980). This paper is available upon request to the author.

34. A State can provide extended unemployment benefits when the insured unemployment rate for the State during a 13-week period equals or exceeds 4 percent and also equals or exceeds 120 percent of the average rate for the corresponding 13-week period in the preceding 2 years. Extended benefits are triggered for all States when the seasonally adjusted insured unemployment rate for the Nation averages 4.5 percent or more for the 13 most recent weeks. These extensions are considered an automatic response to economic fluctuations and are excluded from the high-employment budget.

35. Thirteen weeks of extended benefits were legislated temporarily in 1958–59 and again in 1961–62. In 1972–73, an additional 13 weeks of benefits were provided in States with an insured unemployment rate of 6.5 percent or more. In 1974, Federal Supplemental Benefits (FSB) provided initially for an additional 13 weeks of benefits beyond the 39 weeks available under "regular" and "extended" benefits. The Tax Reduction Act of 1975 subsequently increased the duration of FSB benefits to 26 weeks, thus providing for a total of 65 weeks of unemployment benefits in most States. In addition, 1974 legislation established the Supplemental Unemployment Assistance (SUA) program to provide up to 39 weeks of benefits for people who were not in industries covered by unemployment insurance but whose work histories would otherwise have qualified them for benefits. Both FSB and SUA expired in 1978.

36. The amount that can be earned after retirement without offsetting benefit reductions is limited. Under the Social Security Amendments of 1977, this limit increases annually through 1982, when it will be $4,200 for persons under age 65 and $6,000 for persons aged 65–69. For persons aged 70 or more, there will be no limitation.

The cyclical response from this group is relatively small, because over 90 percent of the eligible population aged 65 or more is currently receiving benefits, and because a high percentage of the rest is self-employed or is likely to have sufficient seniority to escape shortened work schedules and unemployment.

A review of three studies indicates that a 1 percentage point increase in the unemployment rate increases OASI benefits 0.19 percent in the first year and 0.35 percent in the second. At 1979 program levels, the corresponding dollar amounts are $170 million and $310 million.

Social security disability benefits.— Social security disability insurance (DI) benefits, enacted in the Social Security Amendments of 1956, accounted for $13.5 billion of Federal expenditures in 1979. Several studies in the last 5 years have found that DI benefits are cyclically sensitive, because there is a large pool of employed but physically impaired persons who are potentially eligible for DI benefits and who may decide to obtain them if they are affected by a worsening of economic conditions.[37]

Research by the Social Security Administration and the Congressional Budget Office found the cyclical sensitivity to be greater for DI than for OASI benefits, although the range of estimates was significantly wider for the former. Based on these results, the adjustments to high-employment expenditures assume that a 1 percentage point increase in the unemployment rate increases DI benefits 0.4 percent in the first year and 1.5 percent in the second. At 1959 program levels, the corresponding dollar amounts are $55 million and $215 million.

Food stamps.—A nationwide food stamp program was established in 1964 to support food purchases by low-income households. The Federal Government sets benefit levels and the States specify eligibility standards. Legislative changes are a major cause of the rapid increase in food stamp expenditures, from less than $0.1 billion in 1966 to $6.3 billion in 1979.

Several studies—both cross-sectional and time series—by the U.S. Department of Agriculture and others have found food stamp expenditures to be sensitive to unemployment. This sensitivity is not surprising because households must meet an income test, an asset test, and a work registration requirement to be eligible for food stamps. The results from the studies fall within a very narrow range, and indicate that a 1-percentage point increase in the unemployment rate increases the number of beneficiaries by between 7.6 percent and 9.2 percent, and that this increase generally is in the same quarter as the unemployment rate increase.

Based on these results, a 1-percentage point increase in the unemployment rate increases food stamp expenditures 7.7 percent in the first year and 8.2 percent in the second. The corresponding dollar amounts, at 1979 program levels, are $485 million and $520 million.

Aid to families with dependent children.—The aid to families with dependent children (AFDC) program was one of several public assistance programs begun under the Social Security Act of 1935 to provide cash benefits to low-income households. Initially, assistance was provided only to needy children, but in 1950, assistance was extended to the adult in the family responsible for the children, usually the mother. In 1961, States were given the option of providing assistance to unemployed fathers; 26 States currently do so. Benefit levels are determined by the States.

Over one-half of the cost of the program is borne by the Federal Government. In 1979, AFDC benefits totaled $11.0 billion, of which $5.8 billion was borne by the Federal Government.

Because States determine both the eligibility standards and the benefit levels, programs vary widely. Accordingly, the cyclical sensitivity of AFDC may vary significantly from State to State. All of the studies reviewed found that an increase in unemployment increases the AFDC caseload, as more households become eligible for benefits.

Based on these studies, it is estimated that a 1-percentage point increase in the unemployment rate increases Fed-eral AFDC expenditures 1.65 percent in the first year and 3.3 percent in the second. The corresponding dollar amounts at 1979 program levels are $95 million and $190 million.

Medicaid.—Medicaid, which originated in 1965, finances the medical care costs of low-income persons. It is linked to the Federal public assistance programs, in that all States that have a medicaid program (only Arizona does not) are required to provide medicaid assistance to AFDC and, generally, Supplemental Security Income recipients. A majority of States cover other low-income persons as well.

Medicaid expenditures have increased rapidly, reflecting a large expansion in coverage and unusually large increases in the cost of health care. Federal expenditures, which account for slightly over one-half of total expenditures for this program, increased from $1.5 billion in 1967 to $12.9 billion in 1979.

The number of persons eligible, the participation rate, and the average benefit paid, which reflects the amount and type of health care services provided, are potential sources of cyclical sensitivity of medicaid expenditures. All of the studies reviewed, some based on national data and some on State data, found that the medicaid caseload was positively correlated with the unemployment rate. This correlation was limited, however, to the AFDC-related caseload, and the average benefits paid to the cyclically sensitive portion of the caseload was less than the average for all recipients.

Based on these results, it is estimated that a 1-percentage point increase in the unemployment rate increases Federal medicaid expenditures 0.5 percent in the first year and 1.0 percent in the second. The corresponding dollar amounts at 1979 program levels are $65 million and $130 million.

Veterans education benefits.—About 90 percent of the participants in veterans education programs (GI bill) pursue schooling and 10 percent pursue on-the-job training.

An increase in the unemployment rate leads to stepped-up participation in the schooling programs, probably because unemployment, or a higher probability of future unemployment,

37. Paul Van de Water, "Disability Insurance," *American Economic Review*, vol. 69 (May 1979), pp. 275-78.

reduces the opportunity cost of additional time spent in school. In contrast, participation in on-the-job training programs declines significantly when the unemployment rate rises: Although the demand for such training increases, the supply offered is reduced, as firms foresee difficulties in employing the trained workers.[39]

A 1-percentage point increase in the unemployment rate is estimated to increase veterans education expenditures, on balance, 2.4 percent in the first year and 4.0 percent in the second. At 1979 program levels, the corresponding dollar amounts are $55 million in the first year and $95 million in the second.

Other expenditures.—There is no evidence to suggest that Federal purchases of goods and services, almost one-half of which are for compensation of employees, are cyclically sensitive. Most grants (other than for AFDC and medicaid), such as for highway construction, education, and water and sewer facilities, are generally believed to be cyclically insensitive. One grant program enacted in 1976—antirecession fiscal assistance—was linked directly to the unemployment rate. However, because the program was temporary and represented a discretionary response to a cyclical downturn,

38. See Edgar Allen Paden, "Estimating Federal Expenditures for Veterans' GI Bill Training," *Congressional Budget Office technical staff paper*, forthcoming.

expenditures under it are included in high-employment expenditures. Net interest expenditures were not found to be cyclically sensitive. In their effect on interest expenditures, cyclical changes in interest rates were about offset by cyclical changes in the volume of Federal debt.

Quarterly estimates.—Quarterly estimates of the cyclical sensitivity of regular unemployment benefits are based on equation (25), described earlier. The estimates for other spending categories are based on a review of annual sensitivity estimates from other studies. Because the high-employment budget is estimated quarterly, annual estimates were converted to quarterly estimates. Quarterly estimates are shown in table 19.

Table 19.—Response of Cyclically Sensitive Expenditure Categories to One Percentage Point Increase in Unemployment Rate

Quarter and year after increase in unemployment rate [1]	Total expenditure adjustments	Regular unemployment benefits	Old-age and survivors benefits	Disability insurance benefits	Food stamps	Aid to families with dependent children	Medicaid	Veterans education benefits
Millions of dollars, at annual rates (based on 1979 program levels)								
First quarter	2,870	2,355	45	--------	289	38	24	22
Second quarter	3,192	2,355	134	14	517	76	52	44
Third quarter	3,417	2,355	215	00	517	114	78	69
Fourth quarter	3,635	2,365	290	137	517	152	104	84
First year	3,290	2,355	170	65	455	95	65	55
Fifth quarter	3,615	2,355	310	215	520	190	130	95
Sixth quarter	3,615	2,355	310	215	520	190	130	95
Seventh quarter	3,615	2,355	310	215	520	190	130	95
Eighth quarter	3,615	2,355	310	215	520	190	130	95
Second year	3,615	2,355	310	215	520	190	130	95
Percent increase at annual rates								
First quarter	2.06	25.78	.05	--------	8.20	.60	.20	1.00
Second quarter	2.29	25.78	.15	.10	8.20	1.32	.40	2.00
Third quarter	2.45	25.78	.24	.50	8.20	1.96	.60	3.00
Fourth quarter	2.61	25.78	.32	1.00	8.20	2.64	.80	3.60
First year	2.35	25.78	.19	.40	7.79	1.65	.54	2.40
Fifth quarter	2.74	25.78	.35	1.60	8.20	3.30	1.00	4.00
Sixth quarter	2.74	25.78	.35	1.60	8.20	3.30	1.00	4.00
Seventh quarter	2.74	25.78	.35	1.60	8.20	3.30	1.00	4.00
Eighth quarter	2.74	25.78	.35	1.60	8.20	3.30	1.00	4.00
Second year	2.74	25.78	.35	1.60	8.20	3.30	1.00	4.00

1. It is assumed that the unemployment rate remains one percentage point higher over the period.